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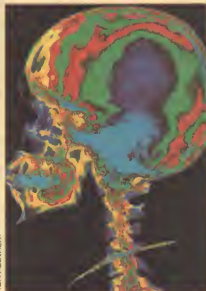
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and transformed the world we live in. The roster of international luminaries who will be writing for OMNI or captured in revealing and candid interviews will include such notables as:

ALVIN TOFFLER, THOR HEYERDAHL, FREEMAN DYSON, RENE DUBOS, JACQUES-YVES COUSTEAU, DAVID BROWER, BARBARA MARX HUBBARD, ALTON BLAKESLEE, LEWIS THOMAS, I.J. GOOD, DAN GREENBERG, EDMUND O. WILSON, BUCKMINSTER FULLER, MARGARET MEAD.

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AGFA-GEVAERT

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Gregory Benford gives a warning to Martin Corey, who is in imminent danger of being attacked by a stooping raven-bird while contemplating Martha and Stephen - or is it Leon? And, even though an occasional spaceman picks through the rubble of an earthbound city, life goes on.

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Spend billions of dollars to build a space colony from scratch? Pie in the sky? Why not pizza? All we have to do is catch an asteroid, heat it up, and hollow it out. Mining companies can make their fortunes and give us all some elbow room at the same time.

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by Robert Gonsalves 16
Black lung disease, third-degree burns, poisonous gases, and the incredible boredom of the assembly line are conditions faced daily by workers around the world. But relief is in sight. Robots have already begun to assume those risks, and soon they will be taking on the most hazardous duties of all, babysitting and housekeeping, while you test your leisure time skills against their smarter cousins.

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INTERVIEW: Gregory Benford

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Science fiction may be pretty shoddy at times about scientific accuracy, but that doesn't keep a fellow from enjoying himself. ... and hoping for better.

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MIDNIGHT BICYCLIST

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more than just reaching adulthood. If that psychological change didn't occur soon, he would be cast out of the village, weaponless—a quick death, unless the silent ones found him first.

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Galileo/Magazine of Science and Fiction is published bimonthly in January, March, May, July, September, and November, at 339 Newbury Street, Boston, Massachusetts 02115. Single copy price: \$1.50. Subscriptions: \$7.50 for 6 issues, \$12 for 12 issues. This issue published September 1978. All characters and settings contained in stories are purely fiction. The factual accuracy of non-fiction articles is the responsibility of the author. No responsibility is assumed for unsolicited manuscripts, but all submissions are welcome, no query necessary. All submissions should contain a self-addressed, stamped envelope. Second-Class Postage Paid at Boston, MA, and additional mailing offices. Advertising rates available on request. Copyright 1978 © by Galileo Magazine

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Artist Larry Blamire freelanced this issue's cover, but we knew there was a story in it somewhere and asked three authors to tell it. We had planned to use the best of three, but we liked them all. What do you think?

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Pro-File

Our Authors

*This page: Terry Lee,
M. Lucie Chin, Robert Lovell.*

*Facing page, clockwise from top left: Robert
Gonsalves, Gene DeWeese, Joe L. Hensley,
John Kessel, and Kevin O'Donnell.*

WE BEGIN our third year with three of our favorite authors back again, three new authors taking on the challenge of putting the same picture to words, and a piece of black comedy from two professionals not often seen in SF.

Telepathy is the subject of "Tunnels of the Minds," the latest offering from **Kevin O'Donnell**. "Most TP stories limit the TP as though it were a radio transmission. I thought I'd limit it in terms of one's access to other minds." He has placed his story against a primitive setting, thus increasing the importance of telepathy to cultural survival in a hostile environment. If you missed Mr. O'Donnell's previous four appearances in our pages, you may wish to know that he has given reading, daydreaming, and garden puttering as his major hobbies, the Hardy Boys as his favorite childhood reading, and Agatha Christie as one of his most enjoyed authors.

John Kessel returns with "The Incredible Living Man" using a concept also developed in his illustrated serial, "Crosswhen," for which he shares credit with Terry Lee. Mr. Kessel claims his upbringing in Buffalo, New York, gave him a "grimy steel plant of a soul," but it is the soul of a GHost which is of concern in his incredible future of rented bodies and lost persons. "I want to write stories that are well-constructed and intricate, with strong characters, which work on more than one level and which describe some corner of the mysterious world and the curious, absurd creatures we are."

Fellow-Kansan **Terry Lee** is not only



an extraordinary artist, but, unlike many in his field, has backed up his visions of the shapes of things to come with knowledge of the substance as well. He has both a B.F.A. in Commercial Art and a B.A. in psychology and philosophy from the university of his home state. He is 30, married, and still not wholly supported by his pen. We are working on changing that.

Our second story from New Yorker **M. Lucie Chin** deals with a subject of current controversy—clones. How close can you get to another human being and still remain an individual? "The Legacy of Joseph Penn," Ms. Chin informs us, "is one of five stories dealing with the same characters." Amazingly, writing is not her first love. "Currently, my primary medium is color photography—limited-edition prints." She began

reading science fiction in high school and lists as her favorite authors Roger Zelazny and Ursula LeGuin. Their influence? "Pure envy."

Another author whose writing plays second fiddle is **Joe L. Hensley**; he's a judge, presently serving a six-year term with the fifth judicial court of Indiana. He has also been a prosecuting attorney and served as a member of the Indiana General Assembly. His Honor claims an interest which "goes way back to the dim days of SF," and can remember "carrying home lurid pulps and hiding them from prying eyes." So not all those young minds were twisted and deformed by the experience. Mr. Hensley has just completed a novel in collaboration with Julia Coppersmith which concerns the final appeal of a convicted felon and draws on both SF

and his legal background.

But Hensley worked with another partner on our present offering, "The Midnight Bicyclist." **Gene DeWeese**, is, like his co-author, from Indiana, which influences his writing in two ways: most of his stories are set in small, midwestern towns, and he is as yet unmugged—the latter connection may only make sense when considering the sanity of bicycling at midnight. His interest in SF, though of long standing, is not exclusive. Mr. DeWeese has written romantic suspense and horror novels for Doubleday and Playboy press. In addition, he has produced a series of programmed texts for NASA on space navigation. He confesses to being a bicycling nut. There are worse vices.

The first of the three authors to complete a story based on the visual concept of Larry Blamire's cover paintings, **James Lester** was inspired by a fondness for samurai movies—which he notes is not the same thing as being a Clint Eastwood fan. Of Welsh ancestry, he says of his race, "They have inflated opinions of their singing and accomplishments while managing to look like untrustworthy chipmunks." His taste in literature runs to "basic mindrot—the first SF I ever read having been Robert E. Howard's *Conan the Barbarian*, the standard by which I have judged everything since."

Eugene Potter approached our cover illustration from a classic angle—time travel and biblical reference. Born and raised in northern Wisconsin, where he works as a librarian, his first interest has always been in writing, with a secondary fascination with anthropology. At 47, he has discovered a new interest, which he shares with his wife: limnology. On sunny days, he informs us, he might be found wading in local brooks, collecting small bugs from the bottoms of rocks. In that his marriage is a happy one, perhaps there is a lesson in this for all of us.

Having spent the last couple of years spinning stories to his grandchildren while nestled around the family fireplace, **Robert J. Corry**, author of "The Negotiator," decided it was about time to put something into print. A senior public accountant, presently employed by the Commonwealth of Massachusetts, he enjoys vacationing on Cape Cod, the smell of bayberry candles, and SF. Robert Heinlein, T.H. White, and Thomas Pynchon are his favorites.

And there is more science, too. In this

issue, we offer you an assessment of the present and future of robot technology by **Dr. Robert A. Gonsalves**. Dr. Gonsalves took his doctorate from Northeastern University in 1965, and currently works at his alma mater as Associate Professor of Electrical Engineering. He is also a senior staff scientist at Elkonix Corporation in Burlington, Massachusetts, where he does robotics research with support from the National Science Foundation. Dr. Gonsalves has observed robots in action at almost all the U.S. companies employing them in an industrial capacity. He has also visited their manufacturing sites in Japan, Germany, and Switzerland. When he first encountered a fully mobile industrial robot, he says, his first reaction was fear. "Programming the arm was fun and watching it

repeat the movements in slow motion was fascinating. But when it moved into high gear, I jumped two feet backwards."

Scientist **Robert Lovell** did not like our suggested title for his article, "You Bet Your Asteroid," not believing the world to be quite ready. Working as a "third-generation" engineer with a large Chicago corporation, he considers himself to be a real, dyed-in-the-wool science fiction fan—indeed, we first met him last year at the Miami WorldCon. In addition to his verbal theorizing, Mr. Lovell paints (he illustrated his own article)

Gary Hudson and **Jeffrey Elliot** have been with us several times in the past, and space is short, as usual, so we will unceremoniously end our chatter here.

—G—





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Editorial

Floyd Kemske

WHEN WE included a reader survey questionnaire in issue #7, we were hoping for a reasonable return...say, five hundred or thereabouts. So far we've received over two thousand and they are still dribbling in. It is very gratifying to see this interest among our readership, but we have to ask you to please stop sending them. We are waist-deep in them as it is and the office mice are beginning to complain that their holes are covered.

Nevertheless, we have managed to analyze the first one thousand returns (a statistician friend of ours says that is a large enough sample for some reliable judgments) and are now prepared to tell you readers something about yourselves.

Half of you are married and half are single. A statistically insignificant (but otherwise very important) number of you took the trouble to describe alternative arrangements, as might be expected from SF readers. We offered seven age groups with which to describe yourselves and the largest portion of you (25%) chose 30 to 39 years. The next largest age group (20%) was the one designated 26 to 30. We offer our apologies to the thirty-year-olds, most of whom were uncertain as to which box they should check; a typo put them in both age groups. At the ends of the spectrum, 11% of you are over 50 and 6% are under 18.

About three-quarters of you (74%, actually) are men. Most of the remaining quarter of you are women, but there were a smattering of other types, including a half dozen who checked both

boxes and one who drew his or her own little box on the form and claimed to be "A White German Shepherd Dog."

You are well-educated. Ninety-seven percent of you have completed high school, 52% of you have graduated from college, 81% of you have attended college at one time or another, and a full 25% of you have been to graduate school.

When we made up the questionnaire we did not include enough occupational categories. This deficiency became apparent when the largest group of you (27%) checked the box marked "Other" and specified occupations ranging from corporation president to convict. One of you is a "frisbee player" and a surprisingly large number of you are letter carriers. We say a surprisingly large number because (with the service we get) we can't believe we have that many friends in the Postal Service. The next largest group after "Other" are engaged in scientific and technological work (20%). After that, 19% are in education (teachers and administrators), and one lady said she had a right to check every single box by virtue of her position as housewife. Right on.

Your median income, falling in the range \$12,500 to \$15,000, approximates that of the families of the nation at large, which is \$14,958. Fourteen percent of *Galileo* readers have annual incomes exceeding \$25,000. When you consider that almost a fifth of you are students and presumably have very small incomes (22% of you make less than \$5,000 per year), you are probably better off than the families of the general U.S. population, of whom 17.8% make over \$25,000.

We thought it very interesting that 47% of you own houses and 62% own color televisions. You are a fairly affluent group: 4% of you even own home computers and 3% have video recorders. Items owned by more than half of you include American cars (65%), black and white televisions (54%), stereo systems (52%), assorted cameras (64%), and electronic calculators (81%). One of you owns every one of the eighteen items we had listed. His house must look like a merchandise discount outlet. Many of you were irritated that we didn't give you the space to list your motorcycles and campers. One of you also took the trouble to describe ownership of a donkey, geese, chickens, a dog, and a cat.

About 30% of you smoke, but a fairly

large number indicated it was something other than cigarettes (although none confessed what it was). Eighty-two percent of you keep soft drinks on hand. Just over half (51%) keep wine and just under half keep spirits (48%) or beer (47%). One reader indicated that he keeps a pint of vodka on hand "for medicinal purposes only." Here at the *Galileo* offices we take care of medicinal needs with scotch.

In the category of leisure activities, 16% of you regularly purchase games (and were no doubt pleased to see Marvin Kaye's game review column start in issue #9). A quarter of you attend three or more movies per month and 19% of you buy three or more records per month. Ten percent of you attended science fiction conventions in the past year (quite a few others said they had not but would like to), 84% traveled over 200 miles by car, and 44% traveled over 200 miles by air.

What you like to do most of all is read (we should have known that when you took out your subscriptions to *Galileo*). Almost three-quarters of you (74%) buy three or more books in a month. Based on our subscription total at this writing, you are accounting for well over 112,000 book purchases per month! (And by the time you read this (the *Galileo* subscriber list grows by 11,000 to 12,000 per issue), the figure will be over 144,000! Eighty-four percent of you belong to book clubs. About 59% of you subscribe to SF magazines other than *Galileo*, which means 41% of you do not, and you are probably that general interest audience we have been addressing since our inception. As for the other SF magazines, 28% of you subscribe to *Isaac Asimov's Science Fiction Magazine*, 25% subscribe to *Analog*, 25% to *Galaxy*, and 24% to *Fantasy & Science Fiction*. Nine percent of you subscribe to various fanzines. One of you subscribes to thirty-five fanzines. He listed them and we have found his questionnaire to be a valuable addition to the office library.

Believe it or not, half of you refuse to share your copy of *Galileo* with anybody (shame on you). Forty-three percent share it with two or three people and 6% share with four or more (a number of you wrote little notes about how you donate it to your local library).

Special thanks to those of you who took the trouble to write little notes about how you feel about *Galileo*, except the lady who wrote: "I hate your magazine." —G—

Opinion

Robert Silverberg



I TALKED last time of the gaudy new income levels that science fiction writers are reaching these days—a development which, naturally, I find it difficult to deplore. But I did suggest that it is Not Entirely a Good Thing for a young writer of science fiction to be able to earn a living with his typewriter too readily, and I want to elaborate on that this time.

No sour grapes are being mashed here. I began writing SF professionally when I was about 18, and by the time I was 20 I was earning what would still be considered a respectable income today. As a result I moved straight from college to the life of a self-employed writer, and have supported myself ever since without ever being on anyone's payroll. Which was exactly the script I had written for myself in my adolescent fantasies, and I have nothing at all to complain about. Why, then, do I wish a harsher life on those who follow after me? And why do I think the best science fiction comes from part-time writers?

Because most of what I wrote, and blithely sold with such ease, back when I was 20 and 21 and 22, was fiction without content, mere carpentry, mere yard-goods. I had, for my age, an extraordinary ability to assemble pieces of commercial fiction at all lengths, but what I was assembling was derived not from my experience of life but from my experience of reading science fiction, because I hadn't had enough time at that point to experience life very deeply. I thought I had, but I hadn't, which is something that becomes apparent to most former adolescents only a bit after

the fact.

Science fiction is unusual among the fiction genres in that most of it is written by its former readers. I doubt that that's the case with true confessions or detective stories, or nurse novels, or gothics. But at least 75% of the people who have helped to shape science fiction are people who read it with passion and voracity first, often from an early age, and eventually decided to try writing the stuff they loved so dearly. That list includes folk like Isaac Asimov, Ray Bradbury, Frederik Pohl, Harlan Ellison, Larry Niven, Alan Dean Foster, Marion Zimmer Bradley, Barry Malzberg, Arthur C. Clarke, Roger Zelazny, Richard Lupoff, Damon Knight, Lester del Rey... on and on and on.

Not every writer is on the list. Some were only casual readers of SF, turned to it more or less for a lark, and found they had a natural gift for it. I think such people as Robert Heinlein, A.E. Van Vogt, Theodore Sturgeon, and Ursula K. Le Guin fit that category, though I could be wrong. But most of the others were SF addicts from the age of 12 on, started to write it when they were 14 or so, began publishing it professionally at 18 or 19, and were Big Name Writers by their mid-twenties.

You see the problem. A 20-year-old who's led a reasonable conventional life has not yet been through marriage, parenthood, divorce, mortgage negotiations, or much serious illness. He may not have traveled more than 100 miles from his native town. He thinks he knows a lot about love and sex, but his total experience of such things goes

back three or four years, maybe five or six. He can probably drive a car but he hasn't had time yet to learn how more complex machinery works. He's read a lot of Asimov and Heinlein, or maybe Ellison and Silverberg, but he hasn't had a chance to get around to Faulkner, Joyce, Hemingway, or Proust. With a mind stuffed only with science fiction, he's going to write imitations of the stories that he most admires, and if he's glib enough and clever enough he'll probably find some editor desperate enough to buy them, but those imitations, however deft, aren't going to afford much nourishment to readers who didn't discover SF last Tuesday.

The real drawback to early professional success, though, is not that it fills the magazines with third-hand versions of classic stories, but that it brakes and can altogether halt a young writer's intellectual and emotional growth. "We learn everything in solitude except character," Stendhal once said. Writing is done in solitude. While most people are out in the real world, commuting and striving and winning and losing and getting roughed up, the young writer who has arranged his career nicely is sitting home typing. He can get very proficient technically that way—I know whereof I speak—but he is forfeiting that experience of people and places and things that is the true capital of the true writer.

Now we reach the crux. The beginning writer imitates Asimov or Silverberg and makes some sales if he has the knack—okay, good on him. But the developing writer, if he is cut off from the main stream of life by his own

commercial success, begins to imitate *himself*, and what we get is imitations of imitations, the kind of pallid ninth-hand stuff that infests all our bookracks. The author earns a living, the publisher fills his slot, the reader is munching on air.

In my own case, I coped with the problems of early success as a full-time writer by traveling a lot, reading a lot, getting out into the world of events and conflicts as much as I dared—and even so, I didn't produce much fiction worth reading until I was about 30, when the world of events and conflicts had come to find *me*. I also gave up the full-time writing of science fiction by the time I was 25, realizing that it simply isn't possible to save the universe on a full-time basis three times a week, twelve months a year, and hope to achieve any conviction at it.

Many of the most distinguished SF writers of the past decade have been people who did a lot of living *before* they started writing—James Tiptree, Kate Wilhelm, Ursula Le Guin, Gene Wolfe, Joe Haldeman, R.A. Lafferty, to name half a dozen in a hurry. On the other hand, some fine stories have come from very young people, straight out of the Clarion workshops, and I won't name them because those are the ones I worry about, the ones who are gliding, as I did, into full-time writing careers before they have a very good idea of how the world works or who they really are. In the world of mainstream fiction, the classic young-writer situation is the one whose first novel is autobiographical and whose second, if there is one, is worthless. In our field, the situation is one of imitative writing that never gets better because of the feedback tremors that quick success creates.

I am not, not, *not* advocating brutality to young writers. As an editor, I've been responsible for my share of first sales, and then some. But I *do* suggest, for your sake and for the sake of the readership, that you think twice about going into writing as a full-time career, even in these days of big advances for newcomers. To write science fiction as it should be written, you ought to know how *everything* works, from the level of precinct politics to the level of the movements of the galaxies. Nobody in this business does, except possibly Heinlein; but that's the goal. The more time you spend pounding a typewriter before the age of, oh, 27, the less time you have to learn what a writer really needs to know. Everyone suffers that way—you most of all.

Opinion

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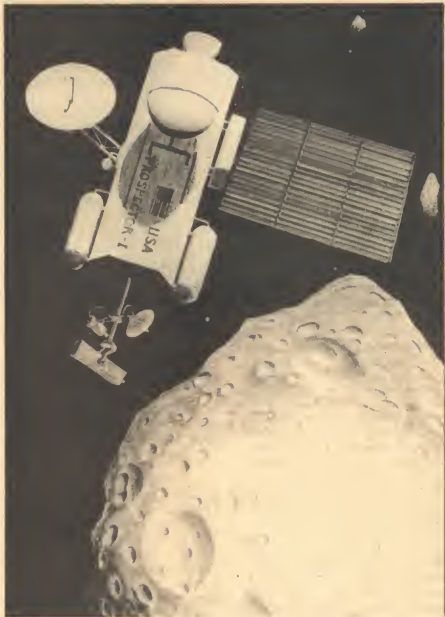
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Asteroid Mining

Robert Lovell



THE RESOURCES of space, like space itself, are virtually limitless. The sun puts out a trillion times more energy than we currently use. The planets and asteroids of our solar system contain enough metals and gases to provide the human race with all that it needs for millenia to come, and space itself offers unique new opportunities for manufacturing processes that could revolutionize society.

The currently popular scenario for the industrialization and colonization of space, as proposed by Prof. Gerard K. O'Neill and others, calls for the use of lunar resources. Lunar materials could be boosted into earth orbit by an electromagnetic catapult called a mass driver. A few minor engineering problems remain to be solved, but the major

problems facing lunar miners are political and financial. Who owns the moon? According to the 1967 Treaty on the Peaceful Uses of Space, the moon technically belongs to all mankind. The current dispute over ownership of the ocean floors could be extended to the moon: should the benefits of lunar exploitation be distributed equally to all nations, or just to those who have the technology and money to go up there and do it? Wars have been fought for less.

Various studies have shown that the lunar scenario for space industrialization will require over \$100 billion in capital. However, there are less expensive ways to achieve the same end result using resources already available in free space. There are probably millions of asteroids, ranging in size from flying

mountains down to house-sized boulders, just waiting to be plucked like ripe fruit falling from a cosmic tree.

The search has already begun for small asteroids that cross or approach the orbit of earth. Astronomers have already catalogued several dozen of these flying mountains and estimate there may be as many as 2,000 "earth-grazers" in the 0.1 to 1.0 kilometer size range. Two recent discoveries are probably typical of the Apollo group of earth orbit-crossers: 1976AA, the first discovered that year, circles the sun 21 times in 20 earth years. It masses about 0.8-1.0 billion tons and seems to be made of the primordial stuff of the original solar nebula. Except for its 19° orbital tilt, it is probably the easiest place in the solar system to get to from earth, besides the moon. 1976UA, about

Mining the Asteroids

400 meters across and massing close to 0.1 billion tons, came within 1.2 million kilometers of the earth, barely three times the distance to the moon. Its orbit is tilted only 6°, making it an ideal candidate for an asteroid capture project.

Question: Is asteroidal rock suitable for space industry?

Answer: You bet your asteroid! (Sorry, but I couldn't resist...)

Reflection spectroscopy has determined for us the surface compositions of hundreds of asteroids. Comparing spectra of asteroids and meteorites, astronomers have discovered that about 10% of the asteroids, including many of the larger ones near the inner part of the asteroid belt, are stony-iron types. Most of the rest are chondrites of various types (chondrites are so named because the rock of which they are composed contains inclusions called chondrules, little globs of magnesium-iron silicates, which apparently resulted from meteor hits), including the carbonaceous chondrites which contain carbon and other light materials. The present population of asteroids seems to be the fragmented remains of a larger population (where do you think all those craters on the moon, Mars, and Mercury came from?) that contained close to a planetary mass. Ceres and Vesta, two of the largest asteroids, are examples of the large group of planetesimals which once existed in the solar system. These planetesimals were massive enough to become geochemically differentiated, with dense iron cores and light rocky mantles and crusts. Billions of years of collisions have produced at least three dozen distinct types of asteroids, from chunks of solid nickel-iron to carbonaceous chondrites which contain water, hydrocarbons, epsom salts, and gypsum. The asteroids contain every element necessary for life support and industry. Some day, perhaps, there may even be a real "gold rush" into space.

An asteroid capture project may be more politically practical because it would not arouse the emotions that "exploiting" the moon would. There are more than enough asteroids to go around, and most people are hardly aware of them in the first place (of course, great care would have to be taken to prevent the asteroid miners from accidentally dropping a million tons of steel on, say, Chicago or Moscow; such an event would certainly arouse a few emotions).

Robert Lovell

Space colonization advocates suggest that a mass driver, assembled in earth orbit, could be used to push an asteroid around the solar system, using small pieces of the asteroid itself for reaction mass. This would involve sending a crew out on a months-long voyage to set up the operation, and would be similar to (but on a smaller scale than) the effort needed to place a working mass driver on the moon. There are a few minor problems, however; if the asteroid is rotating (which they all do, about one or more axes), the mass driver would have to be attached, by means of rotating bearings, to a shaft buried at the "pole" of the asteroid. Otherwise, the asteroid's rotation would spew reaction mass all over space instead of in one direction. Even a small asteroid, massing under a million tons.



has quite an appreciable angular momentum, so that the energy required to de-spin the rock would be about the same as that required to move it from one orbit to another.

The energy required to transfer an asteroid from its original orbit to a new orbit around the earth depends on where the asteroid is located. Most asteroids are in the asteroid belt, although there are many, such as the Apollos, that swing closer to the sun on elliptical orbits. The velocity change (Δv) required to move a typical main belt asteroid to earth would be around 9 km/sec. The energy required to transfer a billion-ton rock from the belt to earth would be about 4×10^{26} ergs, or the equivalent of 10,000 megatons of TNT. 1976AA requires a Δv of about 7.5 km/sec. With a mass of 0.8-1.0

billion tons, it would require 6,700 megatons to put into earth orbit. Small pieces of asteroids with desirable mineral contents can be transferred more easily.

Recently declassified information from the Air Force's Project Orion shows that using nuclear explosives can be a very efficient way to propel large masses in space. A robot probe capable of rendezvousing with the target asteroid, placing atomic bombs alongside at the proper times and locations to produce thrust in the right direction, would probably be the cheapest, most effective way to move an asteroid into near-earth orbit. Unfortunately, existing space law gets in the way again. The Space Treaty of 1967 prohibits "weapons of mass destruction" from being deployed in space. Maybe it's for the

best. How comfortable would you feel if the Soviet Union were to place a thousand or so H-bombs in orbit prior to shipping them out to the asteroid belt for a capture project?

An asteroid capture project would probably use a mass driver rather than the Orion system of sequential nuclear explosions, unless the governments of the world decided to cooperate in the project. They will more than likely cooperate in it anyway for financial reasons (as well as to satisfy the letter of the law—all celestial bodies, including asteroids, are covered by the same treaty that covers the moon), so why not use the nukes and solve two problems at once? Perhaps a joint U.S.-Soviet asteroid capture project can be included in future SALT negotiations as a means of reducing nuclear stockpiles on earth.

Think about it.

The illustrations show how an asteroid capture might be accomplished. The asteroid in question is assumed to be a stony-iron type that will not shatter or vaporize (at least not too much) from the effects of numerous nuclear blasts. Possible asteroid moving schemes not illustrated include solar sail, ion drive, and the "cosmic fisherman" which involves tying one end of a super-strong carbon filament cable to the asteroid and the other end to the moon; as the moon rotates, it reels in the asteroid like a... Never mind.

Once a suitable asteroid has been procured, an orbital smelter or refinery will rendezvous with the rock. Human and robot miners will attack the asteroid with drills and lasers. Chunks of asteroidal rock will be melted at the focal point of a huge parabolic reflector, then reduced by centrifuge or distillation to metals, silicates, and volatiles. Nickel-iron, equal in quality to the best earthly structural steel, can be obtained directly from many asteroids. We can also obtain other basic metals and minerals required by a high-technology civilization merely by adding free solar energy in the form of heat or electricity.

We can roll or extrude metals in space the way we do on earth, but the equipment required would be very massive and expensive to transport. Later, of course, any kind of industrial equipment can be fabricated in free space from asteroidal materials. In the beginning, however, we can use a process called vapor deposition to turn asteroidal metals into any desired shape or size. Vapor deposition, which works

particularly well in the gravity-free vacuum of space, involves spraying metal vapor onto a form or mold (which can be nothing more than a plastic balloon). By controlling the temperature of the process, we can control the final properties of the metal, including high-tensile strength sheet metal in any thickness, structural shapes, or modular components with almost any cross-section.

Perhaps the orbital workers will work in a gravity-free shirtsleeve environment inside a huge plastic bubble. They can assemble weightless (but still massive) components into space factories, space stations, solar power satellites, and magnets and rails for a lunar mass driver. Later projects will include interplanetary ships, space colonies, interstellar probes, and starships.

Eventually, the factory-colony will have consumed the entire asteroid for metals, oxygen, silicon for photovoltaic cells and glass, and "slag" for radiation shielding. An interesting alternative, for those interested in producing a cheap space colony, is what I call the pizza planet. Start with a stony-iron asteroid. Park several square kilometers of solar reflectors nearby and concentrate sunlight on the rock until it begins to melt. As the rock becomes plastic the "centrifugal force" of rotation will cause it to deform into a pancake shape. As the mass of the asteroid flows outward from the center of gravity, the rate of rotation slows to conserve angular momentum. The end result is a slowly rotating disc of rock with a uniform distribution of materials and

whatever thickness or width is desired. Astronauts could land on the giant disc after it cools. They would begin excavating the rock at the axis, where the centrifugal force is least noticeable. Soon, they will dig a donut hole and provide for docking spacecraft. Downward and outward the asteroid miners would dig, sending up rock to the zero-gravity loading dock at the very center. As they excavate tunnels and caverns they would place airlocks over their entry holes, pump in a breathable atmosphere, and set up housekeeping. As they produce the raw materials for space industrialization, they also create more living space inside the disc. A ring of concentric tori, each with slightly more artificial gravity than the one above, and all surrounded by a few meters of shielding rock, would fill the inside of the giant pizza pie (could this be the "pie in the sky" that we've all heard about?), like some kind of cosmic ant farm. Thus, a natural industrial by-product of asteroid mining could be a "free" space colony. Eat your heart out, Gerry O'Neill!

In the long run, as earth's resources are more nearly depleted, extraterrestrial resources will become more economically attractive to industry. A solar power satellite system could raise the average standard of living on earth by providing cheap, abundant, clean energy. As the population of earth stabilizes and the relative economic opportunities expand in space, most heavy industry will transfer from earth to orbit. Basic industries like petrochemicals and steel require most of the energy used on earth and produce most of the pollution. Space, with its abundant energy and mineral resources and a solar wind to carry away pollution, would be the ideal place for such activities. Soon, the green hills of earth will become truly green again. Meanwhile, the population will follow the jobs and economic opportunities and gradually migrate into space.

Why bring asteroids back to earth, future generations will ask, when it is so much easier to travel to the asteroids? After the initial "bootstrap" operation has produced space colonies with advanced life support systems, it will be feasible to send "prime" colonies out to the asteroids and planets (and eventually to the stars) to use local materials to produce new colonies. The solar civilization will soon resemble the Pacific Ocean, dotted with island groups. Each

[continued on page 26]



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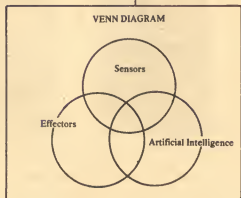
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Robert Gonsalves



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THUS WAS the word robot, a mechanical serf, coined by Karel Capek in his 1923 play *R.U.R.*. Rossum's Universal Robots.

Robots are now at work in industry, painting and welding cars, plucking castings from their dies, and doing a host of other odious jobs, without

complaint. Assembly robots for production lines are in prototype development. At least one entrepreneur claims, against the skepticism of established researchers and manufacturers, to have a \$4000 household robot ready for sale in 1980. And recent advances in sensors and effectors coupled with microminiaturization of computers could produce an explosive expansion of robotics that could have a profound effect on our society.

In particular, robots, or other forms of advanced automation, are likely to displace 10 million production workers over the next 50 years, simply because of economics. As robots do more of our tedious jobs both at work and at home, it will create a surplus of leisure time. According to Walter Buckley, a sociologist at the University of New Hamp-

shire, the possible consequences include a "softening of life—physical, psychological, and social degradation—with much effort spent on sensuous pleasure-seeking even beyond the fantasies created by the media."

In concept, if not in name, robots have been with us for a long time. Perhaps man's fascination with robots can be traced to his speculation on the nature of creation. If a supreme being created man for company and service, cannot man create a lesser being—a robot, perhaps—for the same purposes? And can such a machine, itself, continue this act of creation? Similar questions are raised by Norbert Wiener in "God and Golem, Inc."* who argues that, yes, "operative images, which perform the functions of their original" can be created, even by non-living

machines.

The god-slave concept appears in our earliest writings and drawings. The ancient Egyptians built machines with human features but these were, themselves, objects of worship. The theme also appears in Homer's *Iliad* where the smith-god, Hephaistos, forges golden maidens who "support" him:

... round their lord
came fluttering maids of gold,
like living girls:
intelligences, voices, power of
motion
these maids have, and skills
learnt from immortals.

The role of servants is addressed in Aristotle's "Politics." In discussing the household he makes the distinction between a slave and a shuttle. The former is concerned with the "life" of the household. The shuttle is an "instrument of production" concerned with making things such as garments. Aristotle's shuttles are the ancestors of today's industrial robot.

Through the middle ages and into the 20th century the character of these literary serfs or idols was changed. They became more evil. Shelley's Dr. Frankenstein created a monster that gave soul-less humanoid a bad image for all time. Less sinister is Goethe's magic broom which, following incomplete orders from the sorcerer's apprentice, fetches water until the apprentice nearly drowns. And in Act Two, Capek's robots proclaim: "man is our enemy... a parasite... kill all mankind. Spare no man. Spare no woman. Save factories, railways, mines, and raw materials. Destroy the rest. Then return to work."

This bad press created a technology backlash that can be traced in science fiction literature. Man feared his obsolescence in a world of machines and big brothers.

Enter Isaac Asimov, who brought a systematic engineering viewpoint to stories about robots. In addition to this engineering approach, Asimov set forth the oft-quoted three laws of robotics that are designed to ensure that man is the master in the master-slave relationship.

Under control of Asimov's laws, the robot began to appear as a friendly, clumsy genius—usually quite adorable. Typical is the popularity of *Star Wars*' R2D2 and C3PO, a mechanized reincarnation of Abbott and Costello.

Even Capek saw the wisdom of this

humanistic approach. In the epilogue to *R.U.R.*, Alquist, the last surviving human, gives two robots, Helena and Primus, the secret of their increase only when he sees human qualities in them.

Capek gave us the word but there is no widely accepted definition of what the word robot means. The literary concept usually requires a robot to have mobility, cognitive skills, and human-like appearance. But even in the arts some questions are raised. For example, is HAL, a computer that is neither mobile nor human-like in appearance, a robot?

There is even more division in the scientific community. For example, Richard Abraham at Westinghouse uses the phrase "programmable manipulator" in his work on an assembly robot. Marvin Minsky at MIT uses a three level approach:

Low Level: replaces what people do manually (for example, a numerically controlled machine).

Middle level: challenges a human's dexterity (for example, assembles a typewriter).

High level: adapts to the environment, understands speech, recognizes objects.

And Harvard's Myron Tribus proposes: "Any inanimate device which can be instructed to pursue an alternate goal with some degree of autonomy in a given context."

The problem is illustrated by Lynn White, an historian at UCLA, who notes that some 15th century households had "an ingenious roasting mechanism, a spit which turned very fast when the flames were hot and slowed down as the

fire cooled."

And then he asks, "Was that a robot?"

On this there is some degree of agreement: a robot must sense the environment, modify it, and have artificial intelligence (AI). Thus we can describe a robot by a Venn diagram with overlapping circles which represent these three attributes. (Some of the current technology for these attributes is given in the boxes.)

The literary robot usually stands in the bull's-eye, as does Minsky's high level robot. No such "complete" robot exists today and its arrival is unlikely in this century. The robot-workers in industry lie somewhere on the periphery. They abound and their genealogy and technology can be described fairly completely.

The industrial robot (IRb) is the newest tool of advanced automation. Its origin is traced to the rotary lathe which allowed the worker to build stocks of interchangeable parts for later assembly by unskilled labor. This led to a wide variety of automatic production machinery to fabricate parts and components.

The modern assembly line took shape. But the automation of assembly itself did not develop as rapidly, and today, assembly is still the major consumer of unskilled factory labor that it was at the turn of the century.

In the early 1940s a new dimension for machines was suggested in several theoretical papers in the emerging field of cybernetics. These papers proposed the introduction of learning mechanisms, memory, and logic elements to

Microprocessors

A microprocessor is a data processing unit on a single chip (a square "wafer" of about .2 inches on a side). These devices make it possible to assemble a complete computer system—that uses about 100 wafers—on a board the size of a page.

The profound importance of these devices is their continuing reduction in size, power consumption, and cost. Each is halving every two years. For example, a four function calculator which uses a microcomputer chip has the cost profile shown below:



Associated with the processor is a memory bank to store sensory data. This has a parallel history. The current cost of memory is about .06 cents per bit for a chip with 16K bits. Robert Noyce, Chairman of Intel Corporation, predicts this will drop to .02 cents per bit in 1986 (for a chip with 65K bits).

It is likely that within 10 to 15 years a single chip computer will be available which can execute several million instructions per second, will have about 100K bits of memory, will sell for about one dollar, will be the size of a postage stamp, and can be powered by a small battery.

Microprocessors will gather an exponentially increasing number of applications. Noyce predicts the number of products using microprocessors will increase by a factor of 100 from 1978 to 1986. New applications will include augmented mail and library services, entertainment and educational devices, and work aids for home and office.

allow the machines to achieve set goals and purposes. In the 1950s, computer advances allowed the implementation of such theoretical methods. It became practical to use more and more sophisticated techniques of automation. The IRb, a direct outgrowth of these techniques first appeared in the early '60s, and today there are tens of thousands of them at work.

But it is not only a maturing technology that brings the robot into the factory. Equally important is society's changing attitudes towards the environment, the quality of life, and the safety of the workplace. These concerns are manifested, for example, in OSHA regulations, the soaring cost of product liability insurance, and union demands for satisfactory working conditions. Management is forced to consider increased automation to keep down the cost of products, to keep workers out of hazardous environments, and to ensure quality control so that liability suits are minimized.

In our context, cutting costs means getting humans off the production line. These lines fall into one of two categories: mass production and batch production. In the former, few humans are involved and less expensive products can be manufactured only by enormous capital investments that would completely restructure the lines.

In batch manufacturing, procedures and tools along the line are changed intermittently. For example, an electric motor is offered with three or four shaft lengths and several kinds of mounting brackets; to minimize inventory and line changes, the production engineer may order the motors assembled in unique batches of about 50 or so.

Batch production accounts for about 35% of the nation's manufacturing base and is 10 to 30 times as expensive as mass production because it is so labor intensive. Humans are used extensively because of their adaptability to changing production needs. To cut costs and, not incidentally, to achieve better quality control, the workers can be replaced by robots, provided the robots have the dexterity and the intelligence.

This, apparently, is the lot of the industrial robot: to penetrate the batch manufacturing industry as replacements for workers who perform repetitive tasks with intermittent changes in the work pieces and movements.

As stated earlier, the first generation of IRBs appeared in the middle '60s in the United States, Japan, and Western

Europe. These were largely pick-and-place machines that used memory units to take an arm and gripper through pre-programmed tasks.

There were a lot of starters in the IRb market—at least 17 companies in the U.S., and 50 in Japan. But sales lagged behind predictions and the field thinned. Now there are only a handful of manufacturers in the U.S., including AMF-Versatran, ASEA, Auto Place, Automation Design, Cincinnati Millicron, Nordson Corp., PRAB Conveyor, and Unimation. The last, Unimation of Danbury, Connecticut is the unchallenged leader with an annual sales volume of up to 18 million dollars.

Actual numbers of IRBs in use are hard to obtain. Estimates vary from 3000 to 8000 in the U.S. and from 13,000 to 56,000 worldwide, most of them in

Today's industrial robot is still just a sophisticated shuttle. It usually consists of a solid base weighing a ton or more with a four- to ten-foot arm and a mechanical gripper that moves up to five feet per second.

Sounds simple, but with movements under computer control they are extremely versatile. In fact, it is precisely this versatility that makes the IRb economically feasible. They make it possible to automate those tasks in batch manufacturing which could not previously be automated. The same robot can be re-programmed to perform a variety of tasks.

The experience of the Doehler-Jarvis die-casting plant in Pottstown, Pennsylvania illustrates the IRb in the factory. Since 1963, thirty Unimates have been put to work, tending



Japan. In the U.S., the big three auto manufacturers are using robots in such applications as spot-welding, die-casting, transfer operations, and paint spraying. For example, Ford uses 33 Unimate robots for spot-welding in their Kansas City assembly plant.

The painting application is an interesting microcosm of the robotics-environment/economics interplay. California, and, inevitably, the rest of the nation, has environmental laws requiring automobile plants to emit less than 3000 pounds of hydrocarbon per day. Current painting techniques cause some plants to exceed this. With the human out of the painting chamber, water based paints, deposited at elevated temperatures, or oil based paints and a catalytic converter can be used. Moreover, less paint is used.

aluminum and zinc die-casting machines.

According to Bill Marshall, the plant manager, the plant receives about 6000 orders per year, 60% of them for 3500 pieces or less. The majority of orders are cast in a day or two, each order requiring a new set-up in a batch production mode.

Previously, workers were required to perform two or three repetitive motions per minute under the unpleasant and hazardous conditions associated with die-casting: fumes, odor, extreme heat, and the dangers of molten metal. Moreover, to control quality, the workers' steps should be precisely repeatable from casting to casting. The job is ideally suited for robots.

All 30 robots are used to remove casting from dies. Then the robot holds

Artificial Intelligence

This is an attribute of machines that simulates the human "ability to learn or understand or to deal with new or trying situations." The quote is part of the definition of "intelligence" in *Webster's New Collegiate Dictionary*.

No mobile, self-contained robot has such AI now. However, several industrial robots are linked by cable or radio to smart computers which interpret data from the robot arm and direct the manipulator to perform certain tasks. Typical is a robot now under development at Westinghouse that will assemble small motors. According to Arthur C. Clarke, this is the mode in which most robots will eventually be programmed to function, that is, with a remote, thinking box sending instructions to manipulators which we now call robots.

There are several general themes in AI research. The first is to provide machines with visual and auditory intelligence so that a robot can perform

work that is a natural extension of work now done by humans. Recognition of simple objects in a well-structured visual field and of hand-written text will likely be possible in 5 years. Printed text can be recognized now and a computer can be trained to recognize particular words or the speech patterns of particular voices.

Another theme is the study of structure in learning and problem solving. This research is still in a primitive stage but some encouraging results have been demonstrated. For example, a learning program at MIT allows a computer to understand the concept of "an arch" by being shown pictures of them. The central questions of this "learning" research is, "Do underlying rules of learning exist and what are they?" If these questions are answered, there is likely to be a chain reaction in computer acquisition of intelligence, with large computers acquiring most human knowledge in days.

the casting in front of an infrared scanner to detect deficiencies. If it is alright the robot puts it on a conveyor for trimming by a human. Intermittently, the robot cleans and lubricates the die.

The robots, stronger than humans, have no trouble removing a stuck casting from its die, they never forget to clean the die, and, in general, do a superior job. On the other hand they require skilled technicians to maintain them and are too large for some jobs.

The robots were installed at a modest rate so that transfers and manual attrition did not disrupt the labor force. The union was given the programming jobs and the workers were glad to give up their man-killing jobs in exchange. Marshall indicates that were he to try to remove the robots, the unions would

object the loudest.

Another example of the successful introduction of robots into industry is the experience of the Nissan Motor Corporation in Japan. Their factory at the base of Mt. Fuji employs 5000 people and makes transmissions for Datsun cars and trucks. They have been using robots for more than 10 years.

The Fuji City factory develops, manufactures, and installs its own robots. First installed on the line in 1967, by the end of 1977 there were 1300 units—mostly small, simple robots—in the factory. The company began its move towards advanced automation because they were having trouble recruiting workers, according to Minoru Saegusa, the plant manager. The robots presently in the plant have raised

productivity and have reduced Nissan's work force requirements by 900 people.

The Fuji City installation develops robots for its own use only—they do not even supply other Nissan factories, many of which also produce their own robots. The factory has found this policy to be most efficient: the in-house designer is thoroughly familiar with plant operations and can tailor the machine to the factory's needs; there is no need to train maintenance personnel; and if parts break, the factory can make new ones on the spot. There are 26 people in the robot development division at Fuji City, and Saegusa estimates that it costs about \$8000, including the price of labor, to build one of the factory's standardized robots.

Saegusa said that the factory plans to add 700 more robots to its production line within the next five years. He expects to utilize robots in the aluminum foundry for heat treatment operations and for picking up castings. Nissan does not plan to use any vision system in the near future—it would be too expensive. But if the company could acquire a simple vision machine for \$1000, it would be put to use. Saegusa noted that batch production—which he defined as quantities of less than 20,000—cannot be automated without sophisticated software programs, and these are too expensive at present. Nissan is, however, thinking ahead to a plant which would be completely automated; this would be achieved through a gradual updating of their present equipment.

Even though the industrial robot has been around for more than 10 years, the general public has hardly noticed. The household robot is another matter. In the summer of 1977 Quasar Industries presented a domestic android that is designed to perform several household functions and within six months nearly every major news source in the country reported it.

Quasar's robot, named Klatu, is short at five-foot-two,† weighs 180 pounds, obeys the verbal commands of up to six masters, has a spoken vocabulary of 250 words with options to 5200 words, rolls around in a structured environment (don't move any chairs), and has three-fingered hands to do its work. The robot is programmed to answer the door and telephone, babysit the kids, clean floors, serve pre-mixed drinks, act as a security alarm, monitor the temperature, and control the thermostat or air conditioner. According to Anthony Reichelt, the president of Quasar, the

Vision

Existing systems consist of simple light sources and binary sensors. For example, to measure the projected area of an object, the object is passed between a bright light and a row of photo detectors. The accumulated time the detectors are off is a measure of the area.

A useful vision system in the industrial context would consist of a video camera or an array of self-scanning photo diodes to record the scene of interest. This is interfaced to a computer which extracts simple features of the scene. In this way work pieces can be identified and located precisely enough to be grasped by the robot.

The problem is the identification. Present technology allows only the recognition of objects lying in known, stable orientations. A system developed by John Birk at the University of Rhode Island directs the robot to pick a part at random out of a bin and bring the part to a favorable viewing position for recognition and orientation.

More typical is the system developed by Charles Rosen at Stanford Research Institute for industrial applications. A photo-diode array is interfaced to a Digital Equipment Corporation PDP 11/40 computer. The image is "sliced" into a binary signal which is processed in the computer. A binary sequential tree is established using features (area, center of gravity, etc.) of the objects to be recognized. The algorithm is taught to recognize objects by repeated presentation. Then when a new part is observed the binary tree is followed until classification is obtained or the part is discarded. This system, working with a Unimate robot, has been programmed to assemble a water pump.

The sense technology for more ambitious vision systems, including a range gated laser for one-view distance measurements, already exists. The inhibiting factor is lack of software to properly interpret the data—the AI problem.

android will be sold for less than \$4000 in mid-1979 when he expects to produce them at a rate of 125 a day.

The robot has its skeptics. While admitting that all the mechanical functions claimed for Klatu are possible, researchers at Stanford and MIT, among others, think that a robot in this price range will have such unsophisticated intelligence and dexterity that it will be little more than an expensive conversation piece, a toy.

For example, take the babysitting function (a media term, not Reichelt's). This is described in Quasar's literature as follows: "Personal Monitor Service: The Domestic Android is programmed with a play area, sleeping arrangement or relative rest positions of children, elderly or convalescing persons. Any pre-planned substantial changes in ac-

tion that is not denied by Quasar.

In spite of these objections the Quasar robot has caught the media's attention. At a minimum, it will raise the public's acceptance of robots as something more than a science fiction curiosity, a feat that the more sophisticated industrial robots and research robots have not accomplished.

This leads us to the question: What is the long and short term future of robotics? Recognizing what Arthur Schlesinger, Jr. calls the "futility of futurism", we, nonetheless, attempt an answer.

The short term (5 to 10 year) future of industrial robots is fairly predictable. A 1974 market survey by Frost and Sullivan estimated that in 1985 there would be about 170,000 industrial robots in the U.S., mostly of the

remain the plaything of the rich and a demonstration curio for institutions for five years or so. The general public will probably not buy them at this price and quality. If, however, in about 5 to 10 years the state-of-the-art in memory, computing, pattern recognition, and mechanics makes it possible for a robot to adapt to its environment in sufficient fashion that its chores are less structured, the robot will become useful and cost-effective in the home. At this point they will be bought at prices comparable to cars and could become a major industry.

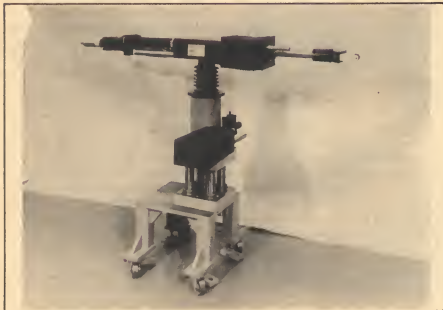
The short term future for artificial intelligence as a component of robots is equally difficult to predict. Government sources have reduced funding levels in the past several years and this will seriously affect the development of software to interpret and act upon data from the sensors.

A 1974 survey of AI researchers by Lockheed and SRI predicted an industrial robot, with visual and tactile sensors, commercially available in 1980. This is probably four years too soon. The same survey predicted a prototype of a robot tutor and a universal game player by 1980. The tutor probably won't appear for another five years or so but the game player prediction may be on target. Chess Challenger by Fidelity Electronics beats an "average" chess player about 50% of the time.

As for long range predictions, we reflect on psychologist Abraham Maslow's categorization of human desires and how the desires have been met in the past several hundred years. The desires occur at distinct levels: basic needs (i.e., food, shelter), material goods (cars, nice homes), and spiritual desires (education, art).

The industrial revolution removed most workers from the farm (54% of the work force in 1870, 4% in 1970) and initiated the automation of production for most material goods. So, lower level desires are pretty well automated now, and most futurists think the manufacturing workers will go the way of the farm workers, all but disappearing in 50 years from the start of some technological breakthrough. Industrial robots are, clearly, one possibility for that breakthrough. If so, we might see up to 10 million robots producing most of our material goods in 50 to 100 years.

The possibilities for robotics at the higher levels of human desires are probably the most interesting. The
[continued on page 26]



ceptable behavioral patterns or positions send the Robot throughout the habitat sounding an alarm."

This function could be performed just as easily by a series of audio and video sensors, connected to a master alarm. To have a robot perform the function seems far-fetched. Unless, of course, one actually has such a robot and it can also do other tasks!

Particularly disturbing to AI researchers is the use of Quasar's demonstration robot that seems to understand random questions and answers these questions. This level of word recognition, interpretation, and response is decidedly beyond the present state-of-the-art. Apparently the demonstrations are under the remote control of human supervisors, a specu-

pick-and-place variety. They also estimated that machines with hand-eye coordination would work on assembly lines by 1980. These estimates are probably off by about five years, with an assembly robot at work in about 1984 and an industrial robot population of 170,000 in about 1990.

As for the household robot, even a five or ten year forecast is very uncertain. Any survey of the public on the relative importance of different kinds of robots—security, industrial, education, medical, space, or household—shows the household robot to be far-and-away the leader. So the field is ripe for a true breakthrough in cost and performance.

Even if the Quasar robot fails to live up to its billing, the market has been stirred. It is most likely that Klatu will

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Beyond Earth

Gary Hudson

THE NEXT twenty years will see a tremendous growth of interest and activity in the field of space industrialization. This observation is supported by a basic fact: there is no doubt that industry in space will make many people wealthy.

A more profound question is this: what will space industry mean with regard to space civilizations? Will there be any true civilizations in space or will the industries off-planet be supported by workers from earth on short duty terms? Who will administer and govern space communities? Who will be permitted to make investments and reap profits from space? These and dozens of other questions familiar to readers of science fiction must now be thought about and acted on in the near future. In the main, the actors in the drama will be people who have not had the benefit of the science fiction viewpoint, yet their influence and actions may well shape the future of space civilization for the next few centuries.

My perspective on the relation of space industry to space civilizations has been stated before: basically, people will go into space for reasons of practical economic gain—and they will stay because some of them, at least, will possess more freedom of action in space than they do on earth. This opinion is in direct contrast to the popular view of "space colonies." The space colony, by its very name, betrays the fact that those who are thinking about the opportunity have not really considered that the colonies might be completely independent of earth.

If we take as an *a priori* fact that

space civilizations will be independent entities with freedom of political and economic action, we can go on to examine the necessary institutions and earth-space relations that these civilizations will possess. If we do not make this assumption, we are forced, by historical precedents, to assume that wars of independence will ultimately be fought between the colonies of earth and the motherland. While the conflicts may be economic more than military in nature, the prospect is grim. Accordingly, we will focus on the more positive assumption.

TECHNOLOGY AS THE MEANS

Poul Anderson, in "Margin of Profit," writes: "It is a truism that the structure of a society is basically determined by its technology. Not in an absolute sense—there may be totally different cultures using identical tools—but the tools settle the possibilities: you can't have interstellar trade without space-ships. A race limited to one planet, possessing a high knowledge of mechanics but with all its basic machines of commerce and war requiring a large capital investment, will inevitably tend toward collectivism under one name or another. Free enterprise needs elbow room."

It is obvious that space provides the elbow room for the free enterprise space civilization which I foresee developing during the next few decades. For thousands of years, according to anthropologist Carleton Coon, the neolithic philosophy has ruled our lives—ever since the planet became too

crowded to permit a migratory hunter/gatherer style of existence. He has paraphrased this philosophy as follows: "You stay in your village, and I will stay in mine. If your sheep come to eat my grass, I will kill you. However, I may need some of your grass for my own sheep. Anyone who makes us try to change our ways is a witch and we will kill them. Stay out of our village." Because of the vast potential of space, involving enormous resources, abundant energy and apparently infinite room, we have at last the opportunity to break free of the neolithic philosophy and the finite earth. The benefits for humankind, as individuals and as a group, are incalculable.

If it is a truism that a society is determined by its technology, it is obvious that some advances in the art and science of space engineering are vitally needed to support an expanding, developing, freedom-loving space civilization.

These technological advances are required for two reasons. First, the activities which we will carry out in space for profit must, by definition, be economically feasible. This must mean low-cost transportation throughout the solar system, but mainly from earth to orbit. Second, the factories, laboratories and other installations of a diverse space civilization will be coveted by a bewildering variety of factions on earth (and perhaps a few in space). Societies in space must be prepared to protect their investments.



SPACE INSTITUTIONS AND RELATIONS WITH EARTH

While I have made a point of talking about space civilizations as being independent of earth, I must frankly admit that such independence will not be total. The markets for space-produced goods and services will obviously be on earth for decades—if not centuries—to come. Accordingly, institutions of the space societies will be substantially analogues of earth institutions. Of course, earth merchants and businessmen (as well as consumers) will find it easier to deal with familiar entities like banks and courts. However, we can foresee a time when the space institutions are profit-centers in their own right, like an electronics factory or an asteroid-mining corporation.

A principle space institution will be government. Rather than some idealistic, monolithic, benevolent government, I believe that we will see the evolution of governments which exist solely to protect the rights of individuals. Having left myself open for the charge that *that* is idealistic, let me hasten to explain. It is my hope that those individuals who originally settle space will formulate governing authorities which will act more as mutual aid societies rather than traditional governments which are planet-bound and tied to control of a specific piece of territory. Space governments may be more like the administering authority of a present free port like Hong Kong, or Singapore. With a strong, precise constitution, such a free port style government may well be the freest form of nation-state ever developed by humans. The concept of citizenship may undergo equally dramatic changes. Citizenship may involve a "state-of-mind" rather than a territorial tie. Space governments could be expected to compete for citizen applications, offering services in proportion to compensation. Thus the term "citizen-stockholder" might be more appropriate.

Space governments may claim the right to control the actions of their citizens wherever they reside, but along with this universal jurisdiction will come the responsibility that they also protect the rights of their citizens anywhere in the solar system or beyond. Such a claim will be upsetting, to say the least, for traditional earth-bound governments. It is possible that we may again enter the era of gunboat diplomacy as space nations and earth nations chal-

lenge each other's dominion over individuals.

While the free port style governments of space might be important in the overall existence of space civilizations, more important in a practical, day-to-day, sense would be the financial institutions. Banks will change from being the heavily regulated, specialized institutions that they are presently, and instead will offer a wider range of financial services. These would include managing money, providing credit, issuing credit cards, and taking deposits. Additionally, they may be involved with the issuance of currency (which the government will almost certainly be prohibited from doing), and they could buy and sell stock in various space development companies.

The advent of advanced, large communications satellites which can broadcast an unjammable, encrypted signal to small hand-held communicators will mean that the influence of the space banks could extend far beyond earth orbit or the moon. These banks may promote the sale of stock in the bank as well as other companies, solicit deposits, and generally engage in a variety of financial activities here on earth. Almost all of these activities would violate some law or banking regulation in nearly every country of the world, yet there will be almost nothing that nations on earth would be able to do to the orbital institutions (which will be protected as citizens of the free port), or to their own citizens, against whom they would find it very difficult to make a case without recourse to the records of the orbital bank.

Such financial anarchy may seem irresponsible and counterproductive, but in reality it could help expand the markets for, and benefits of, space-produced products and services. Earth governments under pressure from entrenched corporate monopolies and unions will certainly erect tariff barriers against space products. (Against products only, of course. It is nearly impossible to establish a trade barrier against a service.) Commerce needs three things to be successful: a product to sell, a party willing to buy, and the means to pay. The communications net and the orbital banks will provide the prospective customers for space products and the negotiable currency. How might the products be delivered to the purchaser, in light of the almost certain prohibition against imports that many countries will erect? I am reasonably

sure that the early Twenty-first Century will see advanced solar system space-ships which can deliver their goods to any point on the earth economically—and surreptitiously. The fine art of smuggling will have entered the space age.

Against the wealth and technological competence of diverse space civilizations, the strongest military powers on earth will contend in vain. Imagine the effects of uncensored communication in Eastern Europe or the Soviet Union (or, for that matter, in the United States). Imagine, further, the impact of advanced consumer goods in a society which is starved for the essentials and the luxuries of life. The potential wealth of space and the technological achievements spawned there can form the basis for free trade (and likewise, the right of



Space Civilizations

free emigration) on earth.

While some space institutions may be transplanted earth corporations (for example, in the field of insurance underwriting or leasing), we can be sure that capital will mostly flow outward to space industries after the next two decades. Earth-based multinational companies will find it advantageous to headquarter in space, just as they now choose to incorporate in countries that have permissive tax and legal frameworks.

The legal system of space civilizations will have its roots in Western common law, from Justinian to Runnymede, but the early settlers will, hopefully, take pains to see that the law is as simple as possible, and easily comprehensible. By doing this, they will have created a new profit opportunity.

With the space civilization in full swing—trading with earth, exploiting the solar system, and looking to the stars—earth will probably become more livable, wealthier, and more in need of a practical system of jurisprudence. As governments become increasingly weaker and more often bypassed in business and personal dealings, there may well arise the need for some objective arbitrations of disputes concerning money, property, or rights.

Space governments and other space institutions can play a role in rebuilding governments and economies around the world. They may do this in a formal sense only rarely (that is to say at the invitation of the host government on earth), but public and business pressure may ultimately lead to the adoption of the space civilizations' code of ethics

and morality. I hasten to add that this does not mean that space civilizations would use force or coercion to occupy earth nations or control earth governments; moral considerations aside, the space civilizations will have too few people to embark on campaigns of conquest. Rather, the legal, ethical, and economic perspective of the successful space civilizations will probably be adopted in whole or part by local citizens of failing earth governments. This may be done informally (as happened during the years following the American revolution *vis a vis* the Old World), or it may be done in some formal, contractual sense. The latter I expect to see quite often. This might take the form of interim management of a nation (Lebanon or Zaire might be considered good examples, for different



reasons, today) until a new government could form. Aid would be given, for a price, to assist a country in providing the infrastructure necessary for a developed, technological society. Communications, education, electrical power, police, national security forces, transportation—all of these could be provided for varying lengths of time, depending on the need.

The need to build military forces to defend one's country against aggression (or occasionally to instigate it) saps huge portions of national budgets the world over. Since space civilizations occupy the "high ground," militarily speaking, they are in an excellent position to offer protection to nations which are too small to defend themselves adequately or who do not wish to squander their meager resources on maintenance of a standing army. Since war is bad for any business which is not directly related to armaments (and is always bad for the independent businessman), space industries and the civilizations which they produce will be ideally suited to enforce peace. Using the observational high ground and economic weapons, it may be that disputes could be settled without firing a single shot.

At this point the well informed reader who is an observer of space law questions may have had too much. Such a person would be anxious to point out that careful reading of the United Nations Treaty on the Peaceful Uses of Outer Space and the Draft Treaty on the Moon will show that such activities as have been suggested violate many of the agreements written in those documents. For example, the moon and other celestial bodies are not subject to appropriation by claim or use or any other means, and activities of a commercial nature in space, if not banned outright, are subjected to the regulation of earth-based host governments. Additionally, any resources found in space are to be used for "... the benefit of all mankind."

The only answer that I can make to such an observation is one of analogy. During the Age of Exploration, a frightful dispute arose between two great sea powers, Spain and Portugal. Both were claiming the same territories in the New World. Finally, the highest authority of the civilized world was called on to adjudicate the dispute: the Pope. His Holiness solved the problem by calling for his sword and dividing a globe of the world into two pieces—one

half to Spain and one half to Portugal.

Naturally, the English (and later, the French) paid very little attention to that solemn arbitration. If they had, this essay would have been written in Spanish, if at all.

My opinion of the UN treaties relating to space is that their lifetime is now measured in years, if not months. However, there will be new treaties and agreements among nations relating to space. This time they will be signed by representatives of both interested parties—nations on earth, and in space.

BEYOND SOL

The possibilities which I have suggested in the preceding paragraphs are in substantial variance with present day perspectives on the affairs of humans in space. While these possibilities are only my opinions, there is some hope that space civilizations may actually evolve along my suggested lines. Consider how few people were actually involved in shaping the constitutional and legal framework of the United States, for example. History can repeat itself: determined individuals who use the available technology to the best advantage in the next two decades will have, I believe, a more than fair chance of bringing to pass such a future. You may take it as a given that I feel such a future is far more desirable than the almost universally accepted notion of space exploration/exploitation as an international endeavor.

But if I am wrong in assuming that the solar system will be settled by rugged individualists and their ilk, is there any hope for that breed? One advantage of space for the inhabitants is that there is so much room in which to operate. Travel between the planets will be time consuming (even with advanced spaceships, travel times across the system will be on the order of one month). With such separation it will probably be some time before people (and civilizations) who don't want to be bothered, are. Beyond the solar system, however, gape the voids between the stars.

—G—

Asteroid Mining

[continued from page 14]

planet and moon and asteroid will become the focal point for growing populations of space homes (Isaac Asimov coined the word "spome" to

describe any habitat, natural or artificial, that could sustain life indefinitely; O'Neill-type space habitats and hollow asteroids alike may soon contain more people than the surface of this planet). A lively interplanetary trade will spring up between the iron asteroids which need water and organics, the carbonaceous chondrites which require metals, and earth. There will be competition for the richest mineral deposits. Different political and religious factions will homestead this asteroid or that moon in attempts to create perfect societies. The political situation in the 22nd century will be very interesting.

By then, of course, the first starships will have left for nearby planetary systems. They will be looking for earth-like worlds to colonize, but such planets are probably few and far between (most of the really good ones will have native populations, no doubt). It is very possible that second- and third-generation spome inhabitants will see their life on the inside as natural and will have no interest in living on the surface of a planet. All they will really need to grow and prosper is a good belt of asteroids.

That's all we need, too.

—G—

Intelligent Computers

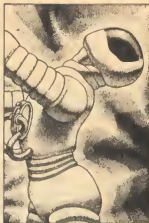
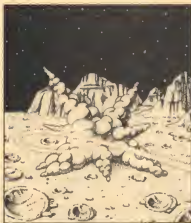
[continued from page 20]

trend is to provide more and more audio and visual stimulation to satisfy these needs. These stimuli include books, telephone, radio, movies, TV, and, not in the same category but perhaps a precursor, TV games and home computers. Robotics provides the opportunity to have tactile sensations included in the stimulations and to have the best human and machine intellects available for company.

As robots serve us more and more, both physically and spiritually, there is the danger that society will be buried in pleasure seeking. On the other hand, some futurists think that increased leisure time may well be spent more productively, for example, creating handcrafted goods and providing personalized services to others—the rebirth of "cottage" industries. Only in this way will society maintain the basic skills needed to grow and to protect itself from domination by more mature and aggressive societies.

—G—

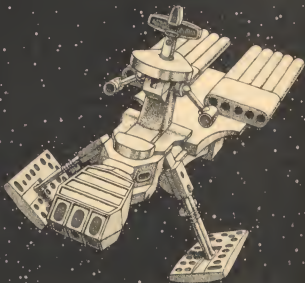
Space Civilizations

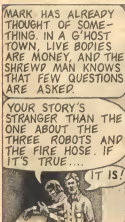
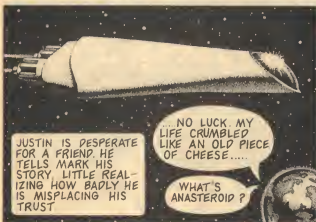
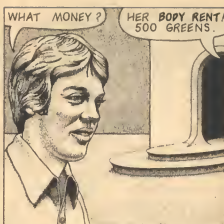
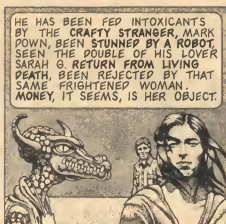


WHO CAN TELL US WITH ANY DEGREE OF CERTAINTY WHETHER THE DRAMA WE ENACT IS COMEDY OR TRAGEDY? DOES AN UNSEEN DIRECTOR STAND BEHIND THE SCENES—OR HAS HE LEFT THE THEATER? IS JUSTIN CASE, 23, MALADJUSTED ASSOCIATE CITIZEN OF AN OVERCROWDED EARTH, THE HERO OF HIS PERSONAL PLAY—OR THE FOOL? WE KNOW THAT LIFE AS AN INDENTURED ASTEROID MINER OFFERED A GLIMMER OF A HAPPY OUTCOME TO JUSTIN—UNTIL THE DAY HIS GOPHER CRASHED ON AN AIRLESS PLANETOID, UNTIL HE DISCOVERED AND IN DESPERATION ACTIVATED THE ALIEN DEVICES THAT HAVE TAKEN HIM.....

CROSSWHEEL

by John Kessel and Terry Lee





WHILE MARK PREPARES TO MORTGAGE JUSTIN'S FUTURE ELSEWHERE IN THE G'HOST TOWN A MAN WITH NO FUTURE PREPARES TO STEAL ONE.

WELCOME TO CONSOLIDATED LIFE EXTENSION, MR. WHITFIELD. WHAT CAN WE DO FOR YOU?



DON'T BE COY, DOCTOR. I'M DYING—AND I'LL TELL YOU WHY I WANT MORE TIME.



WE DON'T CARE TO KNOW....



DO YOU UNDERSTAND LOVE, DOCTOR? I AM NOT WHAT THEY CALL A "WARM HUMAN BEING"—BUT I WAS IN LOVE. SHE TRIED TO LEAVE. I STOPPED HER—I AM A MAN OF CONSIDERABLE MEANS. SHE RAN AWAY.



THEN I FOUND I HAD BEEN POISONED BY A DEGENERATIVE NERVE AGENT.



YOU SEE— PLEASE, MR. WHITFIELD! I TREMBLE.



I TRACED HER HERE, TO LEPA. BUT ANY TIME HAS RUN OUT. GIVE ME A YOUNG, VIGOROUS HOST—AND I WILL DESTROY HER!

...A GAMMA-HOLOGRAM OF YOUR PERSONALITY, IMPRINTED ON THE VIRUS YOU'LL SENSE THE HOST'S MIND BENEATH YOUR OWN, BUT YOU WILL HAVE CONTROL OVER HIS EVERY MOTION. UNTIL, OF COURSE...



UNTIL I DIE.

CHRONOVEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17

WE PREFER THE TERM "DESTABILIZE".

YOU WOULD.



ETHERISED UPON A TABLE, LIKE THE EVENING SPREAD OUT AGAINST THE SKY, JUSTIN AWAKES. HE STRUGGLES TO CONTROL HIS OWN BODY—BUT AT WHITFIELD, VERY WEALTHY, VERY DEAD, RULES.

YOU WOULD.



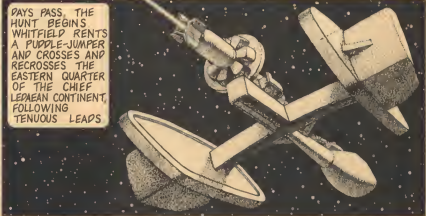
JUSTIN CAN ONLY LOOK ON HELPLESSLY AS WHITFIELD SEEKS HIS BLOODY VENGEANCE.

LET US GO THEN, YOU AND I.

Mr. D. Cruz
Consolidated
Life
Extension



DAYS PASS. THE HUNT BEGINS. WHITFIELD RENTS A PUDDLE-JUMPER AND CROSSES AND RECROSSES THE EASTERN QUARTER OF THE CHIEF LEPAEAN CONTINENT, FOLLOWING TENUOUS LEADS.



THE CHILDREN OF CAIN

Eugene Potter

JANE BENAMOU PUSHED THE high-powered rifle up on her shoulder so it didn't jab her back. The weapon was a nuisance, but she could not visualize going anywhere without it in the Lower Pleistocene African savanna (with who knows what kind of predators about). She spoke into the microphone of her notetaker.

"Day 150. Lower Pleistocene Expedition One, South-eastern Research Synod. 0900 Hours. The troop is watering at the lake. Their 'guardian' stands away at a distance of about fifteen meters—"

She started at a footfall and looked up to see the guardian beside her. The creature's two-and-a-half-meter frame stood easily, one horny hand resting at the end of an impossibly long arm flat on the ground, the other fastened in what anatomists call the "power grip" around a short, curved spear like an assegai. The sunlight was bright and the creature's normally blue skin appeared light, almost green except where the dark shadows under its enormous jaw colored it violet. It made a slow, lazy blink with its beady eyes.

"Do you talk to your people now, little sister?" it said.

"Yes, you might say that," said Jane, marveling again at the creature's use of English. It had not spoken at all for a long time after their first encounter, but had appeared to listen closely and religiously to her frequent log entries.

"I listen," said the creature.

"Certainly," said Jane. She realized that this was its way of learning her language.

The creature turned to watch the troop as Jane brought the microphone back to her mouth.

"The troop does not post observers while watering," she said. "All fifty enter the lake at once, bathing and drinking. Several individuals appear to gather shellfish. They seem to place complete faith in the guardian." She stopped.

"Guardian?" she said to her blue-skinned companion.

"Yes," said the creature without turning to her.

"Do the little brothers and sisters eat shellfish very much?" she said.

"Yes," said the creature, the muscular protuberance at the back of its neck throbbing with some unknown chemical process. "It is permitted to eat creatures of the lake."

"Do you eat shellfish, guardian?"

"No," said the creature. "Guardians do not eat any other creatures. Your world is rich and we find food enough among the trees and bushes."

Members of the australopithecine troop splashed each other in the lake shallows, making loud noises like laughter. Jane had to guard against anthropopathism in her work and so made no attempt to interpret the expressions on the beetle-browed australopithecine faces. She saw a small herd of strange bovids walk carefully from the nearby brush to the lake shore about half a kilometer further down. Horned ungulates with antelope-like grace.

"Have you ever seen animals like those, guardian?" she said, pointing to the bovids.

"Yes," said the creature.

"That's the sixty-seventh new bovid I have observed," she said. "I am at a loss to classify them all."

The guardian said nothing.

Jane decided to bait him a little.

"It is permitted to eat those bovids?" she said.

"Bovids," said the creature. "No," it said and turned to face her. "I told you before, little sister. It is not permitted to eat creatures of the land."

"Yes," she said, "you told me before. I just don't understand. How can the troop survive on shellfish and fruit?"

"Guardians survive on less," said the creature, turning back to watch the splashing troop. Then it added: "The troop is happy. My function is met."

Jane was about to ask it more about its function when they both noticed a disturbance in the lake. The playful splashing stopped as the troop members turned to watch the floundering and bubbling of one of the juveniles, obviously over its head in the water. They stood and stared.

The guardian laid its assegai on the grass and began to trot toward the lake on its stubby legs. It assisted the fully striding (but still almost penguin-like) gait with its horny hands, laying the alternate palms on the ground about every three steps. It ran for all the world like a mobile windmill. Jane ran, too, but knew the guardian had the matter under control.

As the blue-skinned creature waded into the water, its neck protuberance pulsing, Jane began to wonder if she wasn't also coming to depend on the guardian. The thought appalled her, dredging from her mind a certain amount of contempt for

the pitiful "family" of inept australopiths.

Heedless of its trousers and toga, the guardian marched into the water up to chest height and reached a long arm out to the struggling young ape. It seized the juvenile in a precision grip, an act of which Jane had not known the creature was capable. Then it carried the "child" back to shore, draped over the palm of a gargantuan horny hand. The other australopiths went back to their play while the guardian, toga and trousers dripping, set the young one down and rubbed its fur lightly. The young ape appeared to revive sufficiently to strike at the guardian, a blow which the larger creature hardly noticed.

Jane walked back to the rock where she and the guardian had spoken, thinking to retrieve the creature's spear. She began to pick up the weapon and heard the footsteps of the owner's peculiar foot-foot-foot-hand gait. The large hand pulled the heavy curved spear from her grasp.

"You may not have weapons, little sister," it said.

"I was just going to get it for you," she said.

"Little brothers and sisters may not have weapons," it said.

"Why haven't you taken away my rifle, then?" she said.

The guardian just stood there without speaking, blinking the heavy lids of its small eyes. She knew the reaction from whenever she used an English word for the first time. She also knew from before that the next time she used the word the guardian would understand it. As far as the creature was concerned, two contexts established the meaning of a word. Its rapid assimilation of English consisted of just such an endless series of linguistic triangulations. She resolved not to use the word "rifle" again, but puzzled over this obvious deficiency in the creature. Surely it must have figured out the function of the rifle, but it certainly did not behave as if it had.

"What I cannot understand," she said, "is how none of these spears have ever been preserved down to my own time. I expect the haft to deteriorate; it is just wood. But the blade must be a hard substance."

"Yes, hard," said the guardian, "but it is a belief among guardians that we can leave no signs of our presence. The spear is an unstable material."

"What could it be?" said Jane.

"We make it from sand," it said.

"Sand? You don't mean sandstone?" she said.

"No," it said. "We heat the sand."

"Glass?" she said. "You mean that spear-tip is glass?"

"Glass," said the guardian slowly. "Glass. It is the only thing we know which is hard and is yet unstable." It turned to watch the troop coming out of the water. "No more talk of weapons."

"If you must leave no sign of your presence, guardian," said Jane, "what will you do about me? I know you are here and I will return to my own time."

"You will not return," said the guardian.

"What?" said Jane, not a little angry.

"I will keep you here. You will be happy," said the creature.

"Like hell you will," said Jane.

The creature did not respond and she knew that she had used a new word.

"Well, I'm sorry to tell you, guardian," she said, still angry, "that I happen to know you will leave traces. In my time, we have found fragments of the bones of your people. We classified you as *Australopithecus robustus* because we

[continued on page 37]

Larry Blumie



A SONG OF LIFE

James Lester

THE SQUAT, BLUE FIGURE clad in boots and tunic strode on stumpy legs to the edge of the precipice. Oblivious to the cold wind whistling up from the already dark valley below and to the cruiser gleaming in the light of the setting sun behind, it thumped the butt of its wide-headed spear on the mountain rock.

"Hear me, brothers. Hear me, L'moot Rakin, brother to all things on the earth and water and sky, brother to little M'churlp who scurries through the grass in his never-ending haste, brother to proud T'fall who soars on the wind and sings in the white clouds, brother to swift C'fuun who makes the rivers to echo with his playful diving, brother to grand L'ore who stalks in the hills; I, L'moot Rakin, headman of the Gandi, son of L'mayl Tonn who had honor, husband of the beautiful M'paul Slite, father of little L'mann Taal brave already, I who slew the giant lizard S'omme despite his poisonous fangs and foul breath and took his honor, I who have tracked and killed four of my brothers L'ore and took their honor which was great and cost me many days and nights and much hunger and hurting wounds from their claws long and sharp, I who had much honor and was brother to all

of life, I call you, brothers. Hear me, hear my story.

"I was headman of my village that lies in the valley by the river S'tuu, and I was proud and happy. No one in my village hungered even in the coldest winter, for our crops were rich and our hunters strong and full of honor. Each day when I walked among our homes my brothers and sisters greeted me with clicks of welcome and praise. They called me the best among hunters and the most honored of all who lived there. My wife M'paul was the most beautiful of all the women in our village. Travelers who ate on our stone marveled at her loveliness and sang of my good luck in having a beautiful wife who loved me and had given me such a strong young son, L'mann Taal, only three winters old and already as daring as a young C'fiff.

"Aieeeeeee. We were happy and doubted not that our brothers loved us. Nothing made us sleep lightly behind our doors with fear and gnaw the R'aagn wood in hunger and sorrow.

"Then they came, the white ones, the soft ones with skin like worms and voices as high as the fear cry of little M'churlp when caught by the claws of winged T'fall, they who flew over the mountains in their shining spears that went higher than the clouds and even the stars. I had heard of them from travelers who told of their coming from the sky and making a strange village far over the mountains by the shores of a lake that has no other side. Much was told of them for they were a wonder to all who saw and heard of them, but the thing I did not believe when first told it was that they had no honor at all, never made the prayers to our brothers before seeking out and taking the honor from them. This was too much, and I laughed and called the travelers foolish and children to say such things, for no one can be without honor or not know enough to make the prayers to our brothers. But I know they spoke the truth and I was a fool to mock them.

"It was in the evening that the shining spear of the white ones landed in the field outside my village. Everyone rose from their stones and left their food to see it, for we had seen the spears in the sky but never one close enough to touch. I and M'paul went, taking little L'mann with us. Wonder had we in the village for the shining spears that flew even though bigger than the greatest of flyers from the cold mountains. Two white ones came out of the spear which was hollow, one large and one small with hair longer than any sister or brother had.

"Each carried a stick which I paid no mind to, for I could see it was not balanced well for throwing or for clubbing. Jorje was called the larger one and Mmeelee the small. Jorje spoke to us in our tongue, saying he was a great and brave hunter who sought the most dangerous of our brothers. While he spoke, M'paul whispered to me that Mmeelee did not look as if she were happy to be there with him or think of us with honor. Then Jorje said how he wished one of us to lead him and her to find our brothers that he might kill them. We wondered at his foolishness, and I stepped forward as the headman and most honored, saying that no one of our village would lead one such as him. At this Mmeelee grew angry and spoke badly of us, and Jorje was angered with me but also with her. He called out and offered many things to any who would lead him in hunting, but none would answer him.

"Then it happened. There was a great cry among us, for brother L'ore had come down from the mountains and into our field. Hurt he was, limping with one foot held up and his tongue hanging yellow and dripping from his mouth. Never had he come down so far and never would we say the prayers

of honor to him as we do for our brothers who live in the valley with us. I turned to wave my people back to our homes to bar the doors until he had gone and we could make the prayers of honor and take his misery from him.

"Then M'paul, my wife, screamed of L'mann. I saw him. M'paul had loosed her hold on him while we spoke with the white ones, and he had wandered into the field. Now he had seen brother L'ore and was running towards him waving a little child's spear as in play. Our brother had seen him also and stood swaying, waiting for him. There was nothing I or any other could do. L'mann was too far away to catch, and we could not kill brother L'ore without the prayers of honor. M'paul tried to run after him, and I stopped her though my heart felt like the river S'tuu when it overflows its banks.

"The white ones had seen our brother and little L'mann, too. The one called Jorje pointed his stick at brother L'ore, the stick I had paid no mind to. From the stick there came a flash as bright as the sun, and the flash flew out, striking our brother who fell as if dead. For a breath no one moved but little L'mann who ran up and struck his brother's side with the play stick. No movement made brother L'ore, and by that we knew he was truly dead and the white ones had slain him without honor. M'paul ran to L'mann and picked him up, but everyone else stayed where they were.

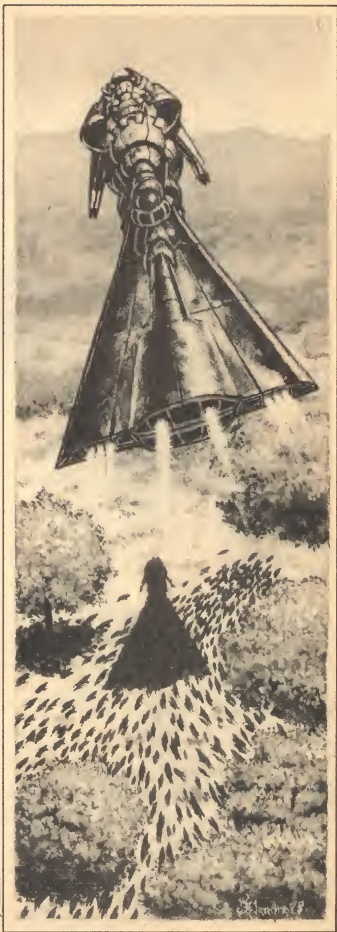
"They knew the debt was mine, even the white ones without honor. I must pay them back for saving L'mann and also pay back brother L'ore for his honor having been lost. So I spoke to the one called Jorje and told him that I would lead him into the mountains to hunt our brothers in the morning, and he was pleased. All that night I prayed to our poor brother for his lost honor and to the brother L'ore of the morrow whom I would help take honor from. I ate nothing, as was always done, and in the morning I was ready.

"Jorje and Mmee were waiting by the shining spear when I came out, and Jorje spoke, saying we would not climb the mountains but fly up to them in his shining spear. I did not fall down in fright and trembling, groveling in the dirt as an honorless might have, for I knew this was but another way my honor had fallen low. So I went into the spear without a word, even when it jumped off the ground and rose high in the air and Jorje made it to turn round and round in the air so that our village was first below us and then above us.

"In less time than the sun takes to travel its width we had landed at a mountain meadow. Then the hunt began, and for three days we sought my brother L'ore in the mountains, climbing up and down them, circling on their sides, but he was too clever for us. This did not disappoint Jorje who grew excited and listened as I spoke of my brother's craft, but Mmee would tire easily and complain often, speaking of places far away where she wished to be.

"Each night she slept alone in the spear, and Jorje would sit beneath it with me and listen like a new child while I told him of all my brothers and how I gave and took honor from them, until on the third night he asked me what happened if one took a brother's honor without prayers. Then I told him that we would never do that. If one had not said the prayers for honor, then one would hide or run away, and if that was no use, then one gave one's honor to his brother. Jorje asked of the L'ore he had killed. I told him he had no honor, for we knew he did not say the prayers, but L'mann was my child so the fault was mine, and I owed a debt to him. 'But what of your honor?' he asked, and I spoke the truth, saying I had no honor until I paid my debt to him. He thought on this for so

[continued on page 40]



Larry Blumie

THE NEGOTIATOR

Robert J. Corry

THE SMAKEET NEVER KNEW how close it had come to a very painful death. Lysette could still hear the Here-am-I warbling happily to itself behind and to the left of the trail they followed. Evolved from Idlewhile's weird fauna, the odd creature was entitled to be content—it was one of the few forest inhabitants which had no fear of predators. An odd, wingless bird, its stomach contracted whenever it was frightened, and that paroxysm of tightened muscles squeezed forth a stream of lethal acid which could target anything within a ten meter radius. Twenty to thirty times more powerful than perchloric acid, it had become one of Idlewhile's major exports. Lysette had learned respect for the Here-am-I after leading several trapping expeditions to catch them for their valuable regurgitation.

Glancing back at the blue-skinned Smakeet Negotiator, Lysette wondered why she'd bothered to alter their course through the dense forest when M'Kolek seemed stupidly bent on suicide. What difference did it make if he died under the charge of a Sheradon or was literally dissolved by a Here-am-I?

The Smakeet seemed deceptively primitive for an upper-caste member of a race which had not only developed interstellar drive, but had perfected its weapons systems to the point where it had taken four medium-class Earth cruisers to capture one scoutship. The Smakeet's energy-adsorption screens had negated the more sophisticated weapons of the cruisers and forced them to use slower, less reliable missiles to cripple the scout—and that had been more luck than skill. Two colonies had already fallen to the alien invaders before the capture of the scout had brought them warily to the negotiating table. M'kolek and his lesser diplomats had arrived on Idlewhile full of contempt and arrogance, preceded by a series of demands which had almost caused Earth Strategists to call off the meeting and launch a massive counter-attack instead. And now this... this inane ritual.

Lysette stopped briefly at a turn in the trail and waited while M'kilek caught up, impatiently shifting her grip on the trunk rifle. It was idiocy: guiding him into Idlewhile's dense forest, she armed only with a knife and the trunk rifle—good only on small game—and he with his *takat*.

She spat on the ground in disgust. The Smakeet had chosen Idlewhile for the talks—picked it after demanding information on the wildlife indigenous to all of the Earth-colonized planets in this sector—because of the Sheradon, the most dangerous beast in terms of brute strength found on any world in the known galaxy. And M'kolek had insisted on the hunt, accompanied by one human guide, before the talks could begin. Lysette had been flabbergasted when he'd arrived at the aircar, dressed in a simple toga/dhoti-like garment, carrying a short ceremonial spear as his only defense.

Several times Lysette had contemplated stunning M'kolek with the trunk gun and leaving his ungainly corpse for the forest dwellers to rend apart. If it were only her life at stake, the Smakeet would have already found his way into Idlewhile's food chain—she'd had more than one opportunity. Yet, much, much more than her desires or her own simple existence as Warden was at stake. Millions of lives could be lost if some kind of peace wasn't negotiated—and M'kolek had to survive the hunt before those negotiations could even begin.

John Bonaventure had had no answer when she'd asked, "What if he dies, if the Sheradon kills him?" They had few clues and no understanding of how the Smakeet culture worked—in fact, Bonaventure told her, Earth Strategists still did not know why the outlying colonies had been attacked, or why the aliens had broken off the attack when the scout was captured. None of it made sense—the hunting ritual least of all.

"Oh, we've been given an official version by the Smakeet," Bonaventure had said, acting as if they'd never shared a week together when the Fleet Admiral's ship had stopped for supplies and R&R six months before. "The Negotiator has to prove his valor, his worthiness to represent the Smakeet in the negotiations; it's part of their hereditary caste system and the series of challenges and tests which allow new families to rise to power... But what's that got to do with us?" he'd asked, clearly puzzled.

About as much as it has to do with me, Lysette thought, remembering again John's remoteness when he'd told her she had to accompany M'kolek on the hunt. The Smakeet refused to deal with middlemen, and insisted that the ruler of Idlewhile guide the Negotiator. That meant Lysette, and she had more than one reason to decline. Her brother had been killed when the Smakeet attacked Oceana. The small colony had been located on an archipelago in the temperate zone.

Like the second outpost victimized by the alien fleet, the colony had been defenseless.

"It comes?" M'kolek asked, drawing even with Lysette, the translator in the knapsack rendering his atonal speech into simple terms.

"No. Not yet. Farther on, there's a clearing. There you'll meet him."

He grunted and gestured that she lead on.

Stepping forward, she wondered if John really wanted her to help M'kolek return alive. If his demands for a settled peace were as unflinching as his posture before the talks began, Earth might be better off if another Negotiator took his place. Or would they bother to replace him, would they simply resume their attacks?

"Find out what it's all about. Prod him. Ask questions. You're the first to be alone with him. It's a chance we can't afford to pass up," John had advised. For a moment, she thought his official stance would weaken, that he'd hold her close for reassurance, even if the Admiral was watching—but he didn't.

It was only when he told her quickly—as they walked the corridor to the aircar—that he'd tried to get M'kolek to take someone else in her place that Lysette guessed how he really felt, trapped in his role as she was in hers.

A distant roar filtered through the trees and Lysette paused to listen. They were closer. The sound was unmistakable, a full-grown Sheradon, and it wasn't far.

M'kolek, standing beside her, appeared impressive in size and physique. Long, muscular arms that reached the ground hinted at an arboreal ancestry; a thick, massive neck which bulged up from corded shoulders and short legs more like tree trunks than limbs argued for a high survival potential. Yet, in the time they'd traveled through the overgrown forest following small game trails Lysette was first surprised and then amused at the alien's lethargic movements. His small, purple, diagonally-pupiled eyes lacked the vitality and intelligence she expected in an aggressive space-going race. If he didn't do any better when he faced the Sheradon, the Snakeet would have to find a new Negotiator—and that was something Bonaventure and the Admiral wanted to prevent.

"You have to make sure he succeeds, Lysette," John had advised her. "And try to learn something—anything we can use against them in the negotiations. It's up to you."

Torn by her instinctive desire for revenge and her responsibilities, she had tried. But every question, each attempt to probe beneath the blunt expression on M'kolek's face was parried with disinterest or non-committal, monosyllabic responses. He'd barely said ten words since they had left the aircar.

"We're almost there," Lysette stopped and, rubbing some moisture from a spongy reservoir plant, spread the coolness over her face and the back of her neck. M'kolek moved up beside her, the orange fringe over his narrow forehead waving upward as the irises of his eyes expanded slightly.

"Time calls," he whispered hoarsely.

Lysette puzzled over that as they crept closer to the clearing.

Her hands were not only damp now but clammy. The Sheradon stood no more than thirty-five meters away. No matter how many times she saw one, the sheer massiveness put her in awe. She'd grown up familiar with the art of hunting and had gone on many treks with her brother on their home planet before she had left to become a Warden. Despite her knowledge of the reasons, even though she knew many of



Larry Blum

the great beasts would starve if their ranks weren't thinned periodically, it saddened her to see one die. It stood ten meters high, twelve long, and weighed an easy four tons. Small, nearly blind eyes peered from its maned head in hungry defiance and an exceptionally large set of black nostrils flared with each testing of the air. Smell and sound were its tracking devices and they were very efficient—too effective for its own good, as the Sheradon regularly ate itself out of prey.

The Sheradon was too close. There was no room for M'kolek to enter the clearing and make his play. Lysette reached into her knapsack and removed one of the special scent cannisters. Adjusting her trunk, she lobbed it over the monstrous head to land twenty meters beyond.

The Sheradon moved with startling force, almost snatching the odorous projectile as it arced overhead. In moments it was upon the small metal container. It snarled in frustration when its pointed teeth found nothing but vapor to gnash.

"Go." Lysette tapped M'kolek on the back momentarily upset at the leathery warmth of the Smakeet's skin.

Slowly, with almost comical majesty, the alien entered the clearing, bringing the ceremonial *takat* into attack position. Lysette almost choked. He was holding the spear in an awkward manner, as if it were a harpoon, or he were some aborigine bushman who whipped slender lances with a strap at the butt end. M'kolek's left palm easily cupped the end of the spear, drawn back by his extremely long arm. His right hand gripped the shaft just behind the glinting metal blade. Squat legs wide, he seemed about to throw the *takat* and foolishly waste his only chance.

The Sheradon had turned as soon as it heard the Smakeet enter the glen and it paused, squinting nearsightedly and uttering a low bass grumble.

Lysette felt her feelings sink toward despair. M'kolek seemed unable to defend himself, hopelessly outmatched.

The Sheradon shook its head once and charged. M'kolek emitted a wild yelp and the rushing beast roared in response.

M'kolek launched the spear, but it went wide, glancing off the Sheradon's shoulder and falling to the ground. The alien didn't move, and Lysette sighted with the trunk gun, knowing it would be useless.

Suddenly, M'kolek leaped to the right, landing and somersaulting over on his extended arms. The Sheradon slammed to a stop and spun to attack again. They circled, M'kolek drawing the Sheradon farther out from the fringe of overhanging branches, edging toward the fallen weapon.

Before he could reach it, the Sheradon charged again. Lysette expected to see M'kolek tumble away, but—incidentally—he stumbled, falling to the side and just escaping the crushing blow of one of the Sheradon's tremendous feet. He didn't get up. M'kolek looked back at her, an unreadable expression on his face.

Without thinking, Lysette found herself running and shouting at the beast as it spun to trample the fallen alien. Fumbling in the knapsack, she hauled out another scent bomb and dumped its contents over herself, throwing the empty can directly at the Sheradon's tender nose. The smell was outrageous. She gagged, thinking of carrion.

She turned, then pelted for the shelter of the woods—the Sheradon following.

Though her tactic had worked, she wondered briefly if she would reach the edge of the forest before the four tons of rage

were upon her. To her amazement, she did, but the trunk gun broke from her hands as she reached the thick undergrowth.

Lysette swerved haphazardly through the brush, staying, whenever possible, near the larger trees in the hope that they would slow the Sheradon. The crashing, ripping sound of shredded timber told her it wasn't much of a plan.

The Sheradon was still coming. . . . relentlessly.

Lysette's breath came in difficult gasps. She had to move faster. Reaching down, she unhooked the straps to the cumbersome knapsack, then stopped, an idea coming as the blurred passage of bushes and trees indicated where she was.

It just might work. If it didn't, nothing would. Panting as fear and nervous exhaustion depleted the initial surge of adrenaline, Lysette tried to listen. It was hard. The cracking of sundered wood, mixed with the Sheradon's bellows of anger, drowned out the rest of the forest noise. She was frantic that she might have guessed wrong.

Then she heard it and nearly stumbled in relief. A low clump of pale violet bushes faced her. She screamed loudly and threw the knapsack ahead, to her right.

As she jumped headfirst over the top of the shrubs and hit the ground in a roll, she saw the knapsack from the corner of her eyes. It was smoking fiercely as it fell. Coming out of the roll, she spotted the Here-am-I and in one movement flung her arms around its plump middle. Snaring the snakelike neck with both hands, she tucked its body against her stomach with her elbows. With one hand she unsheathed her knife and regripped the wildly waving neck, knife flat against its sinewy hide.

There were only seconds to act. The Sheradon burst through the foliage like a runaway mastodon, hurtling down on her.

"Please let it work," she whispered, jabbing the Here-am-I's bloated side with the point of the knife.

It jerked, convulsed, and an acrid stream of deadly juice shot from its dying body—full into the Sheradon's looming jaws.

She'd never heard such an agonized bawl of pain and rage. It beat at her eardrums with shattering force. Then, abruptly, it ceased.

Deafened, Lysette looked up.

The Sheradon lay crumpled on the ground, indigo blood gushing from under its head. . . . and M'kolek stood beside, purposefully withdrawing the *takat* from the corpse's neck. His eyes were three times larger than before, nose slits flared, movements rapid and firm. He had somehow metamorphized into a bloody, victorious warrior.

"It suffered," said M'kolek, his enlarged, intelligent eyes painful to stare at, the sound of his words incomprehensible without the translator.

The dead Here-am-I fell limply to the ground as Lysette rose. Her trunk rifle was at M'kolek's feet. With sudden comprehension, she knew this wasn't the same lumbering enemy she'd led on a hunt. *This* M'kolek was capable of wiping out an Earth colony.

M'kolek raised the bloody *takat* until it pointed unswervingly at her. In a daze, she noted the smooth, fluid steps, the tightened muscles, the fully-aware instincts of a honed hunter move M'kolek closer and closer.

"The hunt was too easy. For honor I gave it my *takat*." Large serrated teeth showed as M'kolek's lips drew back. "You interfered. Now, you take its place.

"You die," rasped M'kolek in her own tongue. The blade, still wet from its previous kill, drew back for a deadly thrust.

Everything around her—all sounds, the trees, the ground, the breeze (now cool)—faded from her perceptions as a buzz grew into a drone in the back of her mind. *M'kolek must live. Millions could die. War. Death. Destruction. Entire planets turned to cinder.* "It's up to you, Lysette, he must survive"—John's words.

With a screech of defiant rage, she jumped back, crouching into a fighter's stance, the blade of her knife flicking back and forth as she tensed for an opening—some way past that outstretched spear. Instinctively, her body began to circle the Smakeet with long-practiced stealth, ignoring the horrified tiny voice of conscience that pleaded, "*Submit. Millions... millions will die.*" This was for her brother, Leon, for the dead colonists.

M'kolek stood erect, suddenly lowering the *takat* and stopping Lysette's responding lunge halfway with an incredibly firm hand that grasped her wrist with impossible speed. To Lysette's astonishment, he smiled hugely, rows of teeth filling his brutish alien face.

"A worthy foe. Come. The hunt is ended." He turned, releasing her, and picked up the trunk rifle, handing it to her.

He gestured toward the trail, amusement in his purple eyes. Dumbfounded, Lysette said, "I don't understand."

"You have proved your valor. You are not *Shashish*, lower-caste. A coward's race.

"We thought you were. Your colonies were weak. They did not fight. They wanted to be conquered, to be ruled. We were wrong." M'kolek lifted a small device from his belt and held it towards her. "All have seen. You have earned the right to negotiate for your race."

He clipped the device back to his broad belt and turned before Lysette could reply. John, the others—they were wrong. It wasn't just M'kolek's valor which had to be proved, it was that of the colonists as well. The thought stilled her anger, her resentment. She wondered, with a brief smile, how the Admiral would feel about being usurped from the negotiations by a simple Game Warden.

Running to keep up with M'kolek's loping, fast pace, Lysette vowed that the Smakeet would find her one bitch of a Negotiator. Her brother and the other dead colonists left her no choice.

—G—

CHILDREN OF CAIN

[continued from page 31]

thought you were closely related to the little brothers and sisters."

The guardian snorted and Jane wondered if it were laughing. "My people go away to die," said the creature, "and we live longer than you can imagine. You must be mistaken. You could not have found our bones. We are not of a type with the little brothers and sisters."

"We have found your bones," said Jane. "We have found the portions of about fifty individuals, the best specimen being a complete skull. Some we have found beside the bones of little brothers and sisters."

The guardian snorted again. "We are fifty individuals on your planet. Each of us has a troop of fifty little brothers and sisters. There are fifty guardians and two thousand five hundred little brothers and sisters." Then the guardian appeared to reconsider, looking closely at Jane. "Two thousand five hundred and one," it said. "Your people are few."

"We must have found all the guardians," she said.

"No, little sister," said the guardian. "You cannot find our bones. We go away when we know we shall die."

"How do you know when you will die?" she said.

"We know," said the guardian, turning to her, "unless we are killed." The creature snorted.

"Maybe every one of you will be killed," said Jane.

The guardian snorted again and Jane had the fleeting impression that the creature had not had so much fun in five hundred years, as if it were listening to a stand-up comic. "There are no creatures here to kill guardians," it said. Its eyelids swung closed lazily, then opened again. It snorted.

The guardian laid down the assegai again and began to strip matter-of-factly of the wet trousers. Jane got a fairly good (scientific) look beneath its toga and noticed a lack of genitals. She wanted to make a note of it, but wanted more to continue the conversation.

The troop had begun to shuffle, after the manner of australopithecids still imperfectly adapted to upright locomotion, toward the brush. The guardian left the trousers on the ground, picked up the spear and began a lopsided windmill stride after them. Jane hitched up her rifle, which had begun to slip, replaced the recording unit in her shoulder bag, and followed.

"Guardian," she called, "please slow down."

The creature appeared not to hear her, but continued its purposeful stride, adjusting direction constantly to compensate for the use of one arm as the other carried the spear.

The sun grew hotter, but nothing like it was at Olduvai before she left the twenty-first century. She concluded early in the expedition that she had entered a pluvial and, as a matter of fact, the grass was much more lush than the Serengeti she knew and the brush was fairly succulent. Berries and fruit abounded, leaves were broad and green. The ecology of grassland and even woodland-savanna is based on a large biomass/land-area ratio due to the fact that grazing ungulates can breed so easily, and open areas are conducive to herding. That was why Jane had cataloged sixty-seven new bovids since she had arrived.

Ungulates—like so many other animals—survive, not by defending themselves, but by breeding in profusion. And that means the grasslands produce predators as well, which was why Jane carried the rifle everywhere she went. The

Serengeti of her own day boasted carnivores in abundance, including jackals, hyenas, leopards, cheetahs, and lions. There was no telling what kind of predators had evolved at this time, before the environmental cataclysms of the Middle Pleistocene. And Jane wondered if she would ever be able to fill in that gap of her research on the Lower Pleistocene. She had not see a single predator since she had been here. She knew it was because of the guardian, but she did not feel she could leave the australopithecine troop because of the importance of human history to the Research Synod.

She had been just a little hesitant about the rifle before she embarked on the expedition, having read so many science fiction novels about the dire consequences of "altering the timestream." The temporal physicists at the Research Synod, however, had assured her that there was nothing to fear, that there was indeed no such thing as a "timestream." She had never been able to understand it, but she was a paleobiologist, not a physicist.

They picked their way through the brush until they came to a spot obviously favored by the australopithecids. Although the area was occupied by another new type of bovid (which she tentatively classified as *Gazella gazella benamoni*), the troop stopped to eat beside the browsing gazelles. The australopithecids picked berries among the bushes and low trees, the gazelles munched leaves. There was very little interference between them, but occasionally one of the larger troop members would push a gazelle away from a bush and the creature would simply comply and move on.

The guardian stood on stubby legs and rested its left hand on the ground. (Jane had noted fifteen days previously that the guardian carried the assegai with its right hand and used it with the left).

"Guardian," she said, pulling out her recording unit to tape any answer, "why are your people here and where did you come from?"

"We came from another world, little sister," said the creature, blinking. "We are here to teach your people."

Jane almost shivered at the reminder that she was so close phylogenetically to the wretched berry-eating apes around her. She took a food concentrate bar from her bag as the guardian continued its explanation.

"To any question," said the guardian, "there are many answers. We wish to teach you an answer."

"Is that why you protect them?" said Jane.

"We must protect you," said the guardian, "that you need not protect yourselves."

"But if they don't learn to protect themselves," said Jane, continuing her disassociation from the australopithecids, "they'll never build a civilization."

The guardian stared at her without speaking. It blinked.

"Civilization is when people live together in very large groups," she said. "We build permanent dwellings, use tools, have extensive communications."

The creature just stared and she decided to slow down. "We live together in very large groups," she said, "and produce more together than any of us could by himself."

"Your world is rich," said the guardian. "Your troops are happy." One of the australopithecids had apparently started an altercation with another and a howling went up as they faced off, addressing their one-meter, forty-one-kilogram frames to each other. They looked like brawling ten-year-olds. They bared teeth.

The guardian trundled over to them and reached out to smooth the fur of one and it struck the blue-skinned creature

repeatedly with its open hands. Both apes began to strike at the guardian, which took, very little notice of the blows, but smoothed the fur of one combatant until it calmed down. With one of them calm, both returned to their berry-picking.

The guardian walked back to stand beside Jane and she wondered if the creature, in its detached way, had taken a liking to her. It certainly showed no reticence in their conversations, although it did seem to harbor the belief that it could hold her here even when her launch window came up. It was almost as if explaining things to the "little brothers and sisters" was part of its purpose.

"I can guess," she said, picking up the previous discussion, "that the question is how to survive."

The guardian was silent and she realized it did not know the word "guess."

"The question," she began again without embellishment, "is how the 'little brothers and sisters' can continue to live."

"Yes," said the guardian. "On some worlds, creatures live by killing other creatures. They kill as they grow and when they have grown enough, they threaten other worlds."

Jane bit off a piece of her food concentrate bar and thought that she had never heard the guardian speak at such length. Then again, if the creatures lived as long as this one claimed, it must have been here for almost a thousand years with nobody to talk to.

"My people will show your people that they can grow without so much killing," it said.

"They must kill in self-defense," said Jane.

"No," said the guardian, "when they are threatened, the guardians will protect them so they will not learn to kill."

"What will happen when the guardians are gone?" she said.

"At that time," said the guardian, snorting slightly, "your people will be guardians."

The hominids began to chatter and scream and the two of them looked over at the troop. The fifty members were addressing all manner of australopithecine abuse at an intruder of their own species. The strange ape carried a small stick like a club and it hissed and spat at the nearest members of the troop, eyes narrowed and teeth showing.

To the extent Jane could read the guardian's strange body language at all, it seemed to be very alarmed as it stepped over to stand between the troop and the intruder.

The troop members intensified their vilification and screamed louder than ever from the cover of the guardian's bulk. Some of them began to throw excrement.

The intruding ape, for its part, treated the guardian with contempt. It struck at the blue-skinned giant with its ineffectual club, bared its teeth, and tried to scratch the leatherlike skin with its fingernails. The guardian endured the blows without difficulty, all the while scanning the horizon as if it were searching for something.

The guardian did not rub the intruder's fur the way it did when it tried to calm a member of its own troop. Jane wandered if its calming influence extended only to its own "family."

The ape finally struck the guardian's knee furiously with its stick, so that the implement broke. The guardian dropped its spear and, while it held its knee with one hand, it used the other to keep the intruder from getting any closer to the troop.

The ape seemed to calm down after its club broke and finally turned and left. Jane supposed it was going off to look for another club. The disgusting little yahoo.

The guardian limped back to where Jane was standing,

using both of its long arms like crutches, dragging the asagai on the ground with one hand.

"Is your knee hurt?" said Jane.

"It will be well before the day ends," said the creature, its neck protuberance rippling and pulsing.

"Where was the guardian of that strange little brother?" said Jane.

The guardian became very contemplative and did not speak.

The troop, apparently exhausted from its encounter, began to nap, most of them stretching out in the shade of the higher bushes, some climbing short trees. The bovids had long since left, and Jane listened over the prevailing buzz of a katydid (or its Pleistocene equivalent) to her notes regarding the three varieties of non-bovid artiodactyls she had classified. She judged the guardian was involved in some healing process for its damaged knee and that it might not even be able to move for the rest of the day. She wanted to consider the problem of the lone ape (could the guardian be wrong about all australopithecines having troops and all troops having guardians?), but these periods of troop inactivity were the only chance she ever had to classify the flora.

She laid her bag on the rock where she was sitting and adjusted her rifle strap. She wanted to go to the meadowlike hillside beyond the brush to examine some of the grasses and tried to arrange the rifle for instantaneous use. She did not even know if she was entitled to the guardian's protection (since the creature did seem to be able to discern the difference between her and the australopithecines), but she certainly did not want to be without protection while the creature might be immobile. Its healing process would require less than a day, but the guardian's time sense was imprecise by Jane's standards and that could be fifteen minutes or six hours.

She might be able to depend on the creature. It had treated her paternally ever since she had insinuated herself into the troop (after two months of observation) ninety days before. And if it enjoyed anything, it certainly seemed to enjoy its discussions with her.

Pondering the imponderable, she shrugged on her shoulder bag and strode off through the bush toward the clearing she knew to be fifty meters north.

When she emerged onto the hillside, she was mulling over the varieties of predator and prey of this prehistoric grassland. She continued to let those thoughts percolate in the back of her mind while she knelt in the grass to get a complete root system. And she was not all that surprised when she heard a swishing noise like a faint breeze and looked up to see the most enormous felid she had ever observed standing about thirty meters away in the meadow. Her heart beat faster when she realized it was staring at her.

She laid her piece of grass beside her, unshipped the rifle, and thought of a line from Milton about eyes like carbuncles. The felid probably massed 3500 kilograms and it hunkered down as it stared at her, seeming to try to bunch most of its body up behind its shoulders. Jane, fighting for calmness, pushed a shell into the breech of her rifle, aimed at the cat's forehead, and squeezed the trigger as the monster sprang into motion. Nothing happened.

Her heart missed a beat as she saw the beast bearing down on her like an express train and she dodged to the left (though the cat was still ten meters away) as she tried to reset the rifle. Then she noticed stumpy blue legs beside her and looked up to see the guardian. It was poised with its spear in

an impossible grip and its legs obviously healed and anchored to the ground like gnarled trees.

Jane dropped the rifle, rolled clear, and looked back in time to see the spear enter the leonine forehead with a splintering sound. The guardian picked itself nimbly off to the right with its elongated arms to avoid being crushed by the enormous body.

Jane realized that the giant's detached boasting had been justified. There was no creature on Earth which could challenge a guardian. That cat had been at least three times the size of her savior.

Jane walked over to the inert form of the carnivore, meeting the guardian who studied the broken spear point it retrieved from the ground, the bulk of the point having been imbedded in the cat's head.

"My rifle didn't work," she said.

"Rifle," said the guardian.

"Yes," said Jane, picking up the jammed weapon, "this thing."

"A weapon," said the guardian. "The rifle."

"Yes," said Jane. "Did you know it was a weapon?"

"Yes," said the guardian. "Little brothers and sisters cannot have weapons. I altered the device to prevent killing."

"Oh, God," said Jane. "I could have been killed!"

"You have a guardian," said the creature. "Little brothers and sisters cannot be killed as long as there are guardians." It turned back toward the brush and stopped.

Jane turned also and saw the entire australopithecine troop facing them from the edge of the bushes. The hominids shuffled slowly toward them and took up positions around the felid carcass. Finally one of them touched it. Another touched it, then one struck it. Another struck it. They began to scream and chatter and beat the dead form.

The guardian walked patiently around the body, pulling enraged australopithecines away and frequently receiving ineffectual blows for its efforts. Jane retrieved her equipment, sat down on the hillside, and watched the orgy of cat flogging and the guardian's pathetically gentle efforts to stop it.

Eventually, the australopithecines tired and walked back into the bushes to pick more berries. Jane and the guardian followed.

"The little brothers and sisters," she said to the guardian, "have tasted violence."

The creature did not respond and she assumed it did not know the word "violence," although she found it hard to believe she had not used it twice in the past ninety days. It continued walking and Jane began to fall behind.

"Guardian," she shouted to it.

It stopped and turned toward her.

"I must leave tomorrow, guardian," she said.

The creature said nothing, as if it did not wish to hurt her feelings.

Jane realized with a start that the guardian was actually capable of keeping her in the Lower Pleistocene. It had been capable of a lot of other things.

"Others will come," she said. "It takes hundreds of these expeditions to make a complete picture. You cannot control every one."

The creature did not respond. She decided she had better cease prattling and began to walk toward the berry patch again. The guardian fell in beside her. She could hardly understand herself. Here was a creature bent on holding her against her will and she insisted on keeping company with it. It was as if she believed the guardian knew what was best for

her. She understood better than the australopiths what a wonderful creature the guardian actually was and she felt herself beginning to understand its obscure pronouncements on violence and life.

They heard screaming at the berry patch. They picked up the pace to investigate the disturbance and arrived to find another troop of about thirty individuals in possession of the area. Their troop stood off, chattering and screaming.

With the scientist's intuition, Jane knew this was a troop without a guardian, that the stranger they had encountered previously came from among these creatures. She hardly had to tell herself what had happened to the twenty or so missing individuals.

Jane noted that some of the intruders carried things: sticks, rocks, and short clubs which looked like bones. They didn't chatter and scream as much as her own troop, but seemed to take up a sort of formation around their half-dozen juveniles. She noticed an infant clinging to a female and realized she had never seen such behavior in her own troop, where the guardian did much of the caring for the young.

A young individual of her own troop got close enough to an adult intruder to throw excrement and was dispatched by a hand-held stone struck to the point of the jaw. The young ape appeared to be killed instantly. The guardian was visibly agitated as it waded in among the enraged creatures.

There were too many in its own troop for it to control them and the strangers began to pelt it viciously with their weapons. Several of the australopiths in Jane's own troop were killed shortly, obviously demoralizing the remainder. The guardian scanned the horizon anxiously while it sustained the blows of the weapon-bearing creatures. It tried to hold some of the intruders away from its own troop, but—even though their troop was understrength—there were too many for it to deal with individually.

It reeled when one of the intruders, creeping up behind, struck square in the center of its neck protuberance with a chipped stone. The rest of the strangers closed in immediately and rained blows on the guardian while Jane's troop fell back in shock, juveniles clinging to adults, and adults shuffling away backwards. It was a scene as she had witnessed not an hour before: enraged hominids flogging a larger beast and continuing long after it ceased to move.

The first thing Jane Benamou asked for when she returned to the twenty-first century base at Olduvai was coffee. The officials of the Research Synod knew the syndrome and were glad to cater to her wishes. They gave her a complete breakfast in a sumptuous suite and told her she would have a full thirty days to finish her report. She did not want thirty days, however. She wrote the report immediately after breakfast and said simply:

"Our world is rich, yet we are the children of Cain."

—G—

SONG OF LIFE

[continued from page 33]

long a time that I thought he slept, until he said, 'Teach me your prayers that I may have honor, and I will be able to give you honor back to you.'

"So I did, telling the words to him, and he said them first in his tongue and then in mine which he could not say well. I half thought to laugh at his speech but did not, for I felt his heart was true and in what he said, no matter how poorly. All through the night we sat beneath the shining spear, and I taught the prayers to him, the one for L'ore, the one for S'omme, and many of our other brothers. When the morning came, I told him that surely he would find brother L'ore today and take our brother's honor, for he had shouted his prayers almost as loud as L'ore himself when that brother challenges his rivals in a mating call.

"Then we ate with Mmellee who grumbled at Jorje for keeping her awake all night with our speaking. He spoke harshly to her, saying she could not have heard us in the spear. Then she grew as angry as a little R'aaf who barks and scolds everything that comes near its nest no matter how large, and they spoke to each other with much anger, saying strong things and calling names on each other until finally she threw down her flashing stick, and said she would not go hunting anymore. Jorje lifted her stick, speaking of things I did not understand about the time before they were mates, swearing if she did not hunt today, he would leave her and let her live for herself without a mate or home. At that she grew frightened and lost all her anger, crying and asking his forgiveness, saying she would do as he asked.

"Then Jorje asked where we should hunt. I pointed to the meadows below, saying that L'ore might have gone there because brother T'eft browses on the grasses. We started down, leaving the shining spear behind. When we were still far above, Jorje cried out, saying he saw something. I saw nothing, but Jorje held out to me the piece of stone he used, clear like water and curved so it clung to his head, sliding over his eyes. It would not fit my head, but I held it so I could see through it and saw great L'ore walking through the meadow toward a line of trees that separated it from another meadow where brother T'eft was. I spoke to Jorje telling him what our brothers were doing. He should go, following a path down, and when brother L'ore came, he would take his honor. I would go towards the meadow where L'ore was now and follow so I and Mmellee might drive my brother on if he turned back.

"This Jorje agreed to, but Mmellee complained again, saying he could kill my brother from where we stood now which was plain nonsense, for how could we kill something which was so far away? Jorje spoke to her with anger again, saying we would do it as I had shown and that she should go with me and do as I said. Then he left, leaving us to go the way we would. I did not worry about sending him alone as I would have with some other hunter, for I remembered how he had struck down L'ore with the flashing stick at the village. I knew there was nothing on all the mountain for him to fear.

"When we reached the meadow, my brother had already gone into the trees. Jorje was gone from the mountain, for though our way was easier, Mmellee was slow and complained with almost every step down. We crossed the meadow and were almost to the trees when suddenly brother L'ore came out of them and saw us. Why he had turned back, I do not know. Perhaps he had heard or smelled something, or

perhaps he knew that one without honor was waiting to kill him. Mmeele cried out at the sight of him, and he came faster, for her cry was high with fear, and he hungered. For a moment I thought she would run away like brother T'eft, but then she raised her flashing stick. I thought my brother was surely dead, but nothing happened. Her stick did not flash. She cried out that it was broken, and I remembered in the morning how she had thrown it down.

"I knew then I would have to take brother L'ore's honor, and I started to say the final prayer to him. Then my heart stopped, my breath became like stone in my chest, and my hands were cold. I had not said the prayers to honor L'ore the night before. All night long I had taunted Jorje until he could do them perfectly, but I had never stopped to say them rightly myself, being vain in my teaching.

"Mmeele was crouched behind me crying, and my brother was charging us, his jaws open so his white teeth gleamed like river stones, his eyes like the two moons of the night. With every step he came ten paces closer. We could not run fast enough to save ourselves. Then Mmeele cried out for Jorje, and I thought of how she was his mate, and he must love her greatly, and I remembered how he had saved my little L'mann from brother L'ore.

"I raised my spear, holding the end to throw it at the right time. My brother came on, his voice loud, singing his song of honor without shame and of bravery without fear. He knew I had not said the prayers and could not take his honor, but he was wrong. When he reached the place I had chosen, I threw my spear into his open mouth. Straight without turning or spinning it flew between his teeth. It struck, and brother L'ore cried out with pain and rolled on the ground, clawing at my spear. I ran to him and pushed on it harder. He tore at the shaft so that great pieces of it were clawed away, and black blood gushed from his throat and onto his lips, staining the grass.

"Then it was over, and he lay still, dead, and my honor was dead with him. Jorje found us there—brother L'ore lying where I had struck him, and I beside my brother saying the prayers for his honor and crying tears for the honor I had once had. We left L'ore there and climbed back up to the shining spear. All the time we climbed, my heart was heavy as I thought of what I must do. When we reached the shining spear, I turned to Jorje and told him I would lead him no more, for I had paid my debt to him. He nodded and said it was so, thanking me and saying he would not make me do what I did not want.

"Then he asked of my honor, and I told him there was no more of it for me. I had killed my brother without prayers, and all my honor was gone. A man can not make his honor. It is only given him by his brothers, and if he does not thank and pray to his brothers for it, then he is worthless—a thief who steals nothing worth having. I could not go back to my village, for I would be a thing of scorn to them. M'paul would scream in horror at my touch and call vile names on me, and my little L'mann would cry at the sight of me. The villagers would take up spears and clubs and drive me from the village so that I might not bring a curse on it. Nowhere would they welcome me, but drive me away. What would I do then, Jorje asked, where would I go, if I had no honor left. I told him the truth of the only place left for me to go and the only thing left for me to do.

Then he was silent and sad. I was sad for him because I did not think he had meant it to happen as it had, and I felt toward him as I did for little L'mann or a small, weak brother.

I began to make my death song then, but he spoke loudly, saying I had not paid my debt in honor to him. I was angered at that, saying he had saved my L'mann and I had saved his Mmeele from brother L'ore. No, he said, for he had been a man, a *thing*, without honor and killing my brother had meant nothing to him. He had not lost honor or risked it, but I was not the same, for I had had much honor and place among my people. If Mmeele had not been with me, I would have kept it even if L'ore had killed me. I had shamed him by giving more in payment for my debt than I owed and made him in my debt.

"Then I answered that even so, there was nothing he could do for me. At that he said there was, for if I had no honor now, then I was like him—without honor, or people, or home—which was so, but this was not the only world. In the sky there were many worlds.

"What mattered those worlds to me, I asked loudly. Then he said he had hunted on these other worlds, and there were many he had not hunted on yet but would. I should come with him and help in the hunt by his side, for he owed me a debt, and I must let him pay it even if it took all our lives. This I thought on, for if he were without honor and place worlds had others like him, I might not be alone in my shame there. Also it was true I had given him more in payment than he had given me which was a devious thing and not truly in honor."

L'moot turned his heavy head slowly, gazing out over the valley and mountains and lifted his spear above him.

"This is my story, brothers. I have lost my honor and never again will I have it. So I will go to Jorje's worlds, where no man has honor, and slay beasts who are not my brothers. Never again will I see the clear waters of the river S'tuu beside my village in the spring, when the white W'ooa blossoms and lets its petals fall and float in islands on the surface; never again will I see my beautiful M'paul and kiss her eyes and tell her softly of my love for her; never again will I hear the happy cries of my L'mann and speak to him of how I took honor from brother L'ore and see him clap his hands in wonder; never again will I see the red rays of the sunset on clouds as they fall down the mountains above my village; never again will I seek my brothers and take their honor and thank them for it, thinking myself the most fortunate and happy of all the Gandi. No, never again will I do these things. That is my story, brothers, which I have told you now.

"Remember me, brothers, remember me, L'moot Rakin when I had honor and was one of you. Remember me when I was happy, not shameful, for I will remember you, forever."

With a cry, L'moot flung the spear out. It seemed to hang level in the air above the valley for a moment, and then the heavy tip tilted down, and it plunged, whistling into the dark below and was lost to sight. L'moot turned and, never looking back, walked towards the waiting cruiser.

—G—

THE MIDNIGHT BICYCLIST

Gene DeWeese
and
Joe L. Hensley

CONSIDERING THE TROUBLE tapes have been known to cause, I'm probably crazy to record any of this, but on the other hand, I'm almost afraid not to. For one thing, it's beginning to look like this crazy scheme of mine might actually pay off—big! I've already managed to get myself some space in a half dozen area newspapers, and there was even a wire service man here yesterday. He shook his head and grinned a lot as he made notes, but he did make notes. More important, the watchers are starting to show up—not just the “Hi-Charlie-how’s-it-going?” types, but real honest-to-God watchers, prowling around the cemetery for hours on end.

To tell the truth, it scares me, thinking how far this might go, which brings me back to why I'm putting this down on tape. If this ever *really* takes off, and the zombie... Well, let me put it this way: I'll need something to keep reminding me of how it really started. I'd hate like hell to get carried away with my own con job, the way a lot of others have done, and start really *believing* all this crap I've been dishing out.

So if you're listening to this down the line a few months or years, Charlie—or whatever you're calling yourself now—

42 GALILEO



Cortney Skinner

THE MIDNIGHT BICYCLIST



don't forget! You're nothing but a goddamned fraud, Charlie, you and your out-of-town zombie! Have fun, but don't forget what's really going on and how you—how I—stumbled into all this. Don't forget. . .

Remember, Charlie? It was just a bunch of accidents—or "serendipity" if you want a fancier-sounding word. First, that fast-food franchise I'd been working up in Elwood went broke, despite all the fast talk of the guy who'd sold it to me. Then, because we were broke, we moved back to Crossville, into that old farmhouse I'd inherited from my father a couple years back. And while I was waiting for something new to develop, I took a job at the assembly plant at the edge of town—third shift, no less. Just temporary, of course, until something better came along, but I was still there six months later, and that's when Cora decided she'd had it and took off for parts unknown. Probably to her mother's place over in Illinois, although I haven't heard a word from either of them. What really gripped me, though, was the fact that she took the car. But, then, if she hadn't, none of this other stuff would've happened, not to me at least, so I guess it was all for the good.

When I discovered Cora and the car were both gone, I started looking around for other transportation, but the only thing I could find was the bicycle out in the shed. It had been mine, probably fifteen years ago. I guess my father just never got around to throwing it out, and when they auctioned off all the equipment after he died, they must've either missed it or decided it wasn't worth the auctioneer's time.

To my amazement, the tires actually held air once I'd walked it cautiously to the air hose at the filling station out on the highway. Even more amazing, I was still able to stay upright on the thing, and by the time I got back to the house, I'd decided I sort of liked it. Almost restful, in a precarious sort of way. Even that night, with a flashlight strapped to the handlebars, the four miles along the back roads to the plant were pleasanter than they had been during any of the previous six months. The next night, though. . .

The pleasures of midnight bicycling were already wearing a bit thin, and I was pedalling pretty hard in hopes of making it to the plant before the flashlight completely expired. Another problem was the wind, right in my face. And remember, this was a vintage bicycle, from the days when only cars had gear shifts, so a headwind was murder. And if all that wasn't enough, I kept having this creepy, tingly feeling all over my back, like someone was trailing along behind me. I knew why I had the feeling (although I've been playing it up to the papers and the rest as a "premonition"), but knowing didn't get rid of it. It had been the late show. Channel 5 was having another Golden Oldies week, and this week's theme was zombies, which could've been one more reason Cora picked this particular week to vanish. She used to like zombies, but not any more. "Some people outgrow such childishness," she said often and loudly, sometimes referring to zombies, more often to just about anything she didn't care for, including me personally. That night it had been a John Carradine special. As always when he wasn't being Dracula, he was a more or less mad scientist, and this time he brought a couple dozen people back to life. They didn't care much for the idea, though, or for the uses he had in mind for them, and, after the usual melodramatics, they demonstrated their lack of appreciation in the last reel. Scratch one more mad scientist.

Anyway, there I was, pedalling along a couple of miles from my house, just passing Covenant Cemetery, when Art

Walters shambled across the ditch and into the road in front of me. Now this wouldn't have surprised me all that much a few weeks earlier. Art was the sort who shambled and lurched a lot, especially late at night, and he was liable to turn up anywhere during one of his binges. He'd start walking home after closing the last tavern, and since he lived as far out in the country as I did, you never knew where he'd end up. Usually Art didn't either, since his sense of direction was one of the first things to go. But like I said, that would've been my reaction a couple of weeks ago. Having him show up like that now jolted me. Or maybe paralyzed is the word.

Art had died almost two weeks ago.

For some reason I stopped, straddling the bicycle frame and just barely able to keep from toppling over. The sensible part of my mind was screaming that I should get turned around and get the wind at my back and get the hell out of there, but it was overruled by something else. Instinct, maybe, or just temporary paralysis.

I could see that Art was still wearing the light grey suit and blue tie he'd been buried in. I remember thinking at the funeral that it was probably the first time he'd worn it since his wedding twenty years before. His face was totally expressionless, his eyes unblinking. There were clumps and smears of clay-like dirt all over him, clothes and flesh alike.

Then he spoke, and it wasn't quite Art's voice. I'm not even sure his lips moved that first time. The moon wasn't too bright, and the flashlight on the handlebars was getting dangerously dim. Anyway, the first thing he/it said was:

"Where am I?"

"You just came out of the cemetery," I said. I'm not sure if my own lips moved any more than his did. I felt pretty stiff all over.

"I know it was a cemetery!" Almost-Art's voice said. "It's always something like that, but this—" The voice was annoyed as it cut itself off and began again. "Geographically, where am I?"

"A couple miles east of Crossville, Indiana." This time my lips moved a little. Some of the stiffness was going away. Not that I was losing all fear and becoming calm, you understand, but my curiosity bump was growing by leaps and bounds. This was, after all, the first zombie I'd ever run into in the alleged flesh. Not only that, it wasn't behaving anything like I'd been late-show-led to believe was typical zombie fashion. This thing was definitely interested in the world around him, not to mention being somewhat ticked off. I was beginning to have a hunch even then (I like to tell myself) that this might turn out to be a Good Thing, if I could keep from blowing it.

If I hadn't already blown it, of course. He didn't seem all that impressed with the information I'd given him. "Don't you have some kind of coordinate system?" he asked. "Latitude and longitude?"

We did, of course, but I hadn't thought about it since high school geography class, and that was a lot of years ago. "We're in the North Temperate Zone," I said lamely, "if that's any help."

Apparently it wasn't. "You mean you don't even know—" he began, then broke off. "Oh, never mind. It's always something like this. The memory is almost totally gone, and—"

He shuddered into silence then, and looked down at himself slowly, maybe reluctantly. In the fading beam from the flashlight, I could see the blankness in his face being momentarily replaced by a tiny grimace. He brushed a bit of clay from the corner of one jacket pocket with a clawlike hand

(like maybe he couldn't control all the finger joints yet), then moved a shambling step closer to the light. I caught the beginnings of a pungent odor, and I wondered how many of his senses were in working order.

"I hate this," he said. His voice was definitely angry, not just ticked off like it'd been when he'd found out I didn't know where we were. "I really hate it!" He brushed at his trousers, not making noticeable headway in clearing away the grime, then at the lapels of his jacket.

Finally he gave up and looked toward me again. It was unnerving to see that, despite the tone of his voice, his face had blanked out again. "Not that it really matters, but who am I?" he asked.

"Art Walters," I said slowly, uncertainly. "Aren't you?" "I'm sure I wouldn't have the faintest idea. For what we pay, they don't give us any extras, like a complete memory or a guide. And in this one—" His face came to life again, displaying another grimace, this one longer and stronger than the first. "—I suspect I'm lucky that even the language is still available."

"If you're not Art Walters, then who are you?" He looked down at himself again and visibly shivered. "You wouldn't understand," he said.

"Try me," I said. Possible Good Thing or not, I didn't appreciate being patronized by a zombie, particularly one that used to be Art Walters.

He looked me over again. His face seemed to be getting closer to normal now, with not as many blank-state interludes. I doubt, though, that Art-alive had ever managed quite the expression that was collecting on his face now. A haughty combination of distaste and superiority. Whoever or Whatever was in there was at least getting better control.

He waved a hand unsteadily at the cloudless sky, dislodging a few more crumbs of dirt as he did so. "I'm from out there." The voice still didn't sound right, but this time the lips definitely moved, though maybe it was just for effect.

"And not from over there?" I asked, pointing at the rows of moonlit tombstones. This was starting to get *really* interesting. A zombie from outer space could create even more of a stir than your average home-grown variety.

"This—this *vehicle* is from there, unfortunately. I am not."

"Vehicle? Art's body, you mean?"

An irritated, indifferent shrug. "Call it what you wish."

"And when you say 'out there,' you mean another star? Which one?"

"How should I know? I'm hardly a scientist. If I *were*—" He stopped, apparently shifting his mental gears. "You know about such things now?"

"I know there are a few billion stars out there, and the theory is that a lot of them must have planets." I'd read enough Sunday supplements and science fiction to know at least that much.

"Well, things *have* changed, haven't they? The next thing you know—" Again he cut himself off in mid-thought, but this time he frowned in puzzlement. "There's something badly wrong with this vehicle," he said.

I could have told him that when I first saw him. "It's dead, if that's what you mean," I said.

"No, not that!" Snappish again. "It wants something. It's a sick feeling. Even at these prices, I shouldn't have to put up with problems like this. But there's definitely some sort of feeling—a craving..."

"Knowing Art, your vehicle probably wants some muscatel."

A blink. "Muscatel? Yes, wine, alcohol, these words are prominent." A musing look. "Strange..."

NOT ONLY AN OUTERSPACE ZOMBIE, but an alcoholic one to boot. Great. But what else could you expect under the circumstances? The thing, whatever it was, had been using Art's body only a few minutes, but Art had been using it—badly—for forty or fifty years. I wondered how muscatel—Art's favorite because of the price—would mix with whatever was sloshing around in his veins now. Then I tried to stop thinking about that sort of thing altogether. It had been a logical thought, and I had a *prima facie* sort of feeling that logic had no place here anymore. Not that kind of logic, anyway. Besides, for my purposes, it was pointless. What I had to do was make sure the Good Thing didn't get away from me before I had a chance to—

"Where can I obtain some alcohol?" he asked, and then added, with another faint shudder: "And I really must find some way to clean this vehicle. This is disgraceful, even for—" He chopped off the thought and returned to the more urgent problem. "But first I must find the alcohol. It is really remarkable, the craving this vehicle retains."

"I could probably find you some," I said.

"Very well, let's go."

Not only alcoholic but autocratic. But maybe I could make good use of the alcoholic part... I collected my courage into a lump and plunged ahead:

"I can supply what your vehicle needs—if you answer my questions."

He went blank for a moment, then parodied a smile. "I'll find it myself," he said and did a shambling one-eighty-degree turn. "I believe you said your local community—Crossville, was it?—was in this direction?"

"It is, but it won't do you any good. Everything is closed at this time of night."

"Closed? Oh, yes, I see. No matter. I'll break in."

"If you can find the right place to break into. You said you didn't have very many of Art's memories."

He stopped shambling and looked back at me. "Very well, I'll get someone else to help me."

"Not very likely. Everyone around here knows your vehicle. And they also know it's dead. You won't get anyone else to even talk to you, let alone buy you a drink." I wasn't too sure about that last, especially if he lucked out and ran into Buck or some other drinking buddy of Art's. Most of them had been at the funeral, but there were at least a couple who wouldn't necessarily remember whose it was at this late date.

"Why not? Why should they be different from you?"

I managed an indifferent shrug. "Most of them are nowhere near as curious as I am, for one thing. And not very many of them would appreciate the distinction between you—whoever or whatever you are—and your vehicle." Probably true, especially late at night after a week of zombie movies on the late show.

"Besides," I added, "you popped up so suddenly, I didn't have time to panic and run. If I'd seen you coming..." Again, probably true, but I would've eventually gotten back within observation range, at least.

He seemed to be considering the information before speaking again, and now he sounded puzzled. "But everyone was so helpful the last time."

The last time...

I shook my head, forcing myself to keep improvising and not waste time speculating. "I don't know who you ran into last time, but I guarantee you won't find anyone very helpful around here now. And I won't give you a chance to sneak up on anyone like you did on me. I'll warn them. You don't look like you can move fast enough to get anywhere ahead of me. Certainly not if your vehicle can't move any faster now than it could when it was... alive. At best, you'll have a lot of trouble, and it'll be a long time before you get what you need. At the worst, someone will take a shotgun and blow a couple of very large holes clear through your vehicle."

Some degree of emotional battle was going on inside the vehicle's head then, that was for sure. Finally, though, he seemed to reach a decision. He was obviously annoyed, but his anger didn't seem to be directed at me.

"Very well," he said, "I agree." And then, as he looked malevolently upward, almost directly overhead: "You haven't heard the last of this, believe me! I'll have you up before the board, every last one of you, and then—" With difficulty, he cut the words off. Slowly, he brought his eyes down to look gravely at me.

"Let's go," he said. "I'll answer your questions, within reason. But no more of this nonsense about specific stars. I can't tell you things I don't know." He paused, getting his supercilious expression back in place. "It wouldn't do you any good anyway. You don't even know your own coordinates."

"Fair enough," I said, stifling my irritation and wondering what to do next. If I had a car, I could drive him home, but if I'd had a car, I wouldn't have found him in the first place.

Luckily, though, the bicycle had one of those sturdy, anachronistic package carriers on the back. I'd never carried a package at all, let alone one as big as this, but it might work. If it didn't, we would have a long, slow walk back to my place at the rate Art-the-vehicle shambled along. And, even at that time of night, there were occasional cars along the road. I didn't want anyone spotting us if I could help it. Not until I got my curiosity satisfied and had some time to figure out what, if anything, I could make out of all this. There had to be *something*, I kept telling myself as I showed him where I wanted him to sit. He limited himself to a couple more skyward-directed complaints and then straddled the carrier. His hands weren't quite as clawlike as before, and he was able to grasp my belt easily as I got on the seat in front of him. He seemed to have gotten control of all the joints at last.

I finally managed to get us rolling in roughly a straight line despite all the dead weight, excuse the expression, over the rear wheel. It made for heavy pedalling, to say the least, but it was partly offset by the inspiration he provided. Whenever I slowed enough for the tailwind to overtake me, I'd catch a whiff of decay that, while not as strong as it had been at first, was still enough to get my legs up to speed again.

I didn't have the breath to ask any questions while I was pedalling, and he didn't volunteer anything, so the ride was made in puffing silence. I did do some thinking, though, so I was ready to have at it when we lurched to a stop and made our way into the house.

"All right," I said when I finally had my breath under control, by which time he was already tracking up the living room carpet and gurgling down a plastic glass of sloe gin, "if you can't tell me where you're from or who you are, exactly, how about telling me what you're doing here?"

He put the plastic glass down empty and looked around. "Really remarkable. I've never come across a vehicle like this before, but it does seem to be responding." He reached for

the bottle, but I snatched it back.

"You said you'd answer my questions," I said, backing out of reach.

He stared at me for a moment, then sighed. "Oh, very well." Before he could say more, his eyes fell on his outstretched hand, which was still covered with several kinds of dirt. The odor, though, was definitely retreating. If it hadn't been, I doubt that I could've stayed in the same room with him. "You have some method of cleansing, I presume?"

I nodded. "And plenty more of this," I said, holding the gin bottle aloft. "But the answers...?"

Another baleful glance skyward, as if he could see right through the ceiling. He muttered a couple of unintelligible syllables, then turned to me again. "As you wish, but—" A faint but ghostly smile crossed his face. "It will serve the bastards right, whatever happens! No court would—Now, what was it you wanted to know?"

"Everything," I said. "But for a start, what are you doing here?"

"It's my wife's fault, really, her and her damned—" He stopped, frowning. "Which reminds me, have you seen anyone else like me lately?"

"Like you? Someone crawling out of a grave, you mean?"

"I wouldn't be surprised. They're *supposed* to connect before burial, but—Well? Have you?"

I shook my head. "You're the first zombie I've ever met personally."

"Zombie? Oh, yes, I see. Amusing. Well, I'm not surprised you haven't seen her. She could be anywhere. They're supposed to get us within a few miles of each other, but they're supposed to do a lot of other things, too." He closed his eyes for a moment. "Maybe this will cure her finally, if she's having as much grief as I am," he finished musingly.

"Who is supposed to get you within a few miles of each other? Why? And what are you doing here?"

"Oh? I thought you knew, the way you mentioned 'zombies'—"

"You mean you really are behind those stories? You come down here just to reanimate bodies? But why?"

"We're tourists, of course."

Tourists? No wonder he's so damned patronizing, I thought. He's talking to a mere native. But so far he'd said nothing that proved he was particularly superior—or even different. The Ugly American from the stars.

"Okay," I said, "you're a tourist, but you don't know where you're from. Do you know where you are?"

"With respect to what coordinates?" he smirked.

I thought for a second. "All right, never mind that. But tell me, where are you in Art's body?"

"I couldn't very well come in person, now could I?"

"I don't know. Could you? Could I—"

"Of course not! That would take years." He seemed to enjoy my ignorance.

"So you just send your minds around to different worlds, is that it? Just to look around? Do a lot of you come here?"

He shrugged. "This isn't a very popular world," he said, and then grimaced. "And there certainly aren't very many who come this way. The better agencies provide live hosts. It's just that my wife feels—" He stopped, grimacing yet again, managing to look a bit embarrassed and disgusted at the same time. The "no frills" flight, I thought. Or maybe it was their equivalent of traveling steerage.

He gave me a look. "I really must insist on the cleansing you have promised."

He seemed to have decided to be fairly open with the native, perhaps because he enjoyed showing off his superiority, perhaps to get in a jab at whoever had sent him here, so I led him to the bathroom and showed him how to fill the tub. I gave him another glass of gin. He tried to be dignified, but he downed it in a couple of swift gulps. Art's reflexes, I thought, and I realized that having even a tiny bit of Art still in there somewhere bothered me a lot more than whatever else was in there.

As the tub filled, he got undressed. He didn't have any trouble with the buttons, but I had to show him how the zipper worked. His only comment was a single "Ingenious!" in the same tone I might've used in complimenting someone who'd just told me he had a cat that knew how to open doors by itself.



THOUGHT ABOUT WHAT UNDERTAKERS did to bodies and quickly took up a post outside the open bathroom door while he finished undressing and getting into the tub.

"What happens when one of you takes over a live host?" I asked when he shut off the water.

"Never having enjoyed that privilege, I couldn't say," he said coldly between splashes.

"Does the host remember anything about it?"

"They're not supposed to."

Amnesia, I thought. Disappearances. Judge Crater. This could explain all sorts of things.

"How many of you come here?" I asked.

More splashing, some of it a bit heavy. The gin was apparently taking effect, no matter what it was having to mix with.

"I couldn't really say. There were ten in the party I came with."

Ten... Ten zombies wandering around loose.

"And there's another tour scheduled in a few months," he went on. "My wife recruited a couple of suckers for that one, which is another reason *this* one was so cheap for us."

At least ten zombies a year, if this schedule was typical... And God knows how many live hosts for the first class passengers. Yes, this could explain many things, particularly if all the tourists were as casual about the local laws as this one was. Possession. Vandalism. Maybe even some—many?—of the senseless killings that had been cropping up so often lately.

But was it going to do me any good? So I'd known and conversed with someone from outer space. So had a lot of other nuts. Without pots of evidence, you couldn't cash in worth a damn. Of course I *did* have the evidence, right in there splashing around in my bathtub, but how long could I hang on to it?

"How long are you staying?" I asked.

"Four of your days." A pause. "And frankly, under these conditions, that is quite enough."

Four days... What could I do in four days? How could I—the splashing halted abruptly.

"What time is it?" The vehicle's voice was tense.

I glanced at my watch. "About one-thirty. Why?"

"I think I'm being called back, but—What date is it?"

"August tenth. Now what—"

"August tenth? Are you sure?" The voice had gone from tension to the beginnings of panic.

"I'm sure. Now if you—"

There was a huge splash. Soapy water came flying out the

bathroom door, followed an instant later by a dripping, soapy vehicle.

"Those incompetent bastards!" it said as it shot past me, all traces of shamble gone. "Those lousy, fouled-up bastards! It must've taken the whole four days to just get me out of the ground! And now they're getting ready to—"

The slamming of the front door cut off the rest of the words.

I ran after him. Not only was my evidence getting away, I still had a lot of questions left.

By the time I got to the front door myself, he was gone, and so was my bicycle. Talk about bastards...

I couldn't catch him, even though I was sure that pedalling a bicycle naked, barefoot, and wet couldn't be that easy or fast. But I didn't give up, either.

I was still a couple of hundred yards from the cemetery, my lungs and legs aching, when I saw the light. Literally. It wasn't there very long, just a few seconds, and if I hadn't been looking right at it, I wouldn't have noticed.

But I was and I did.

The light was a diffuse beam, like a faint, multi-colored spotlight. It came from somewhere up in the sky, but I couldn't see how far up the light extended. Forever, as far as I could tell. And it touched the cemetery, a particular spot in the cemetery.

Something went up the beam, like a fast-moving cloud.

And was gone.

When I got to the spot, there was enough moonlight for me to see the vehicle—Art's body—stretched out on the ground next to what had been his grave. When I got close enough, I could tell that the tourist was gone. Art was beginning to smell again.

My own vehicle, the bicycle, was lying in the ditch.

I looked up into the sky, at the stars that still flickered faintly through the thin, high clouds that were gathering. I remembered the light and the ascent, and that's when the idea hit me. That's when I realized that maybe I'd gotten enough questions answered after all. That maybe the out-of-town zombie really could be turned into a Good Thing for me. If I didn't blow it. If I played it right. If I got some decent breaks for a change.

He'd said there was at least one more party coming through a few months from now. I was probably the only one in the whole world who knew about it, so...

It had worked once before, a couple of thousand years ago, so why not now? I'd be working in the one area where people were soft and gullible, where you could make them believe almost anything. All I needed was to get enough people to listen to me, to get enough people—disciples, believers, acolytes, call them what you will—to watch the graveyards of the world for me. *With* me. Certainly they'd be able to spot at least one of the tourists in that next no-frills group, and one was all I would need.

I'd stake my own claim at Covenant Cemetery, of course, since that's where the precursor had appeared. I'd spend my days and nights there, probably even sleep there. And somehow I'd make people come. No more third shift assembly line for me. No more bankrupt fast-food franchises. From now on I'd be doing my own franchising, and it wouldn't be in the fast-food business.

I wiped the water and soapsuds from the seat and handlebars of the bicycle and, smiling benignly to myself, began to plan my ministry.

—G—

TUNNELS OF THE MINDS

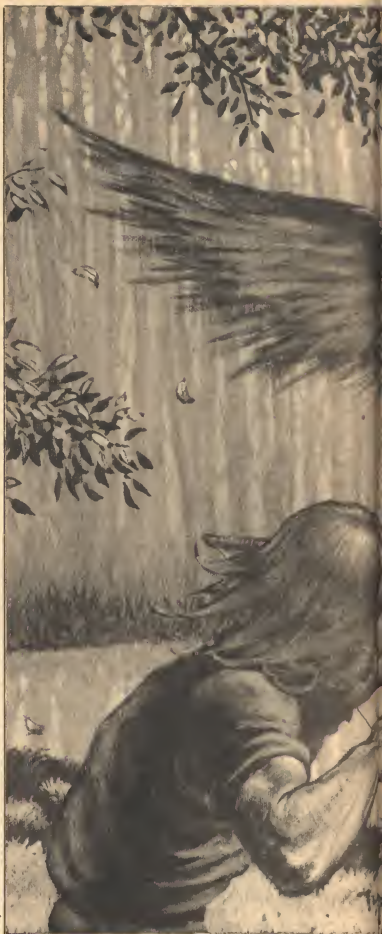
Kevin O'Donnell, Jr.

*In the beginning of OldHome all spoke with the tongue,
Yet the clans of man constantly warred.
Life was so angry, and kinship so rare, that they flung
Through the heavens a world-rending sword.*

QUASSA'S SONG SCENTED THE NIGHT, a feather-grass breeze, drawing them from their tent to the middle of the village. There blazed a bonfire. The needletree smoke was lightly perfumed; on the six-foot logs danced tall orange flames that lit the circle of beaten earth more brilliantly than did the three white moons overhead.

Yaran's grandfather led the family, as was proper. A long-ago scuffle with a greatcat had crippled him, leaving him with an awkward limp, but he was too proud to accept assistance. Behind him came Yaran's father and mother; following them, Yaran and his brother.

*The sun was a candle, the sky full of mushrooms;
Two out of three crumpled dying or blind.
Survivors bore children in midwife-less pain rooms—
Some learned from birthfright to speak through the mind.*



Larry Blumire



When the tribe had gathered and fallen silent, while Quassa's tune still leaped and twisted high in the air, Sankan and Gintan approached from opposite ends of the village. They were evenly matched: tall and slender, long-haired and full-bearded (though Sankan's was kinky black and Gintan's almost white), well-muscled, and fleet of foot. Sankan was smarter; Gintan, more loyal. They had come to pledge bond-brotherhood.

Yaran, watching the fire-sparkle in their eyes, gritted his teeth to keep his emotions private. Sankan, his oldest friend, should have been his bond-brother—the two had been inseparable for years; it was a village joke that if you hit one, the other cried—but Sankan and Gintan had each fathered two children, while he, Yaran, was not even mature enough to marry.

*The sons of the tongue, aloof and suspicious,
Denied that our parents were human.
To live through their witchhunts, cold and so vicious,
We mastered a mimic's acumen.*

The two stood face to face, calloused hands on each other's shoulders. Firelight washed over them in waves of bronze. They studied each other, then slowly nodded.

It is time. The voice of the Men's Chief rang in Yaran's head, undiluted by the two minds which had relayed it. Grudgingly, he prepared to participate. He watched his grandfather ease himself to the ground—the old man had to channel speech between the chief and the fifteen fathers of his clan, but was too weak to do it while standing. It was easier for Yaran's father—he only had two sons, only three lines to keep open at once.

*For years was the crevice bridged over with snow,
While mankind reharnessed its cunning.
But heredity told and our folk had to go
Find a world where we could stop running.*

We are ready, said the Men's Chief. The Women's Chief responded in kind. Instantly there was a shared intensity. Yaran felt his strength drawn upon, meshed with the others', and focused on a section of Gintan's mind, as though he were inside it. He and the two hundred men of the tribe focused on the weak spot that would become Gintan's end of his line to Sankan. Somewhere a baby cooed. The Chief said, *Gintan, we are all aware that you are a proud father, but you must close the line to your infant son now.*

Yes, sir. The childish gurgled ended abruptly.

We seem ready, said the Chief. He scrutinized the weak spot, shifting a man or two unnecessarily, like someone brushing imaginary dust off his hands before dipping into the cook pot. *And here come the women!*

*Racing, searching, hiding, praying,
Ran our fathers' cross the night.
Silent Ones behind us, staying—
Always aft glowed deadly light.*

The men pulsed with Quassa's song, and their massed reverberations gave the women a target. They, inside the corresponding spot in Sankan's mind, pushed outwards, aiming for the familiar beat. Gintan tried to recoil—an instinctive reaction—but the men held him steady. The song grew louder as the women neared, and doubled in volume at contact. Far in the distance, almost drowned out by the echoes of the song, was the sound of Sankan sobbing with pain. Mind-stretching hurt.

Steady, now; hold tight. The Chief hovered nervously as he absorbed the women's rhythm. They surged, and fell away; surged, and fell away. *Ready—the men tightened their grip—set—the circle froze in anticipation—now!* And every point on the circle sped outwards, pulling Gintan's weak spot as taut as possible just at the moment that the women beat against it like surf on a shoreline—the fabric tore. Sankan flowed in. The line was open.

*Here we stopped; here we turned; here we lost
The ships, our past, our peace.
Life is hard; foes abound; but the cost
Has earned us our release.*

The two were bond-brothers, now—closer to each other than they had ever been to their real brothers—and would stay linked unless one died.

Light from three moons drifted down to them, silvering their hair, whitening their shoulders. They read each other's eyes and hearts for a while longer, then turned to announce the traditional bond-trip, during which they would learn the intricacies of their linkage.

We have chosen, said Sankan to his clan leader, who sent it through the Chief to all the village's linked members, *to travel south for four days, and to inspect the land for signs of the Silent Ones.*

It was a typical bond-journey, but the tribe reacted approvingly. Except for Yaran, who turned from the festivities and made his way back to his family's tent, where he sat in smoky darkness, driving his right fist into his left palm, listening to Quassa singing:

*The tunnels link us one to another,
Mother, sister, father, and brother.
Bound together, we are free;
Free, we find true unity.*

THE NEXT MORNING, Yaran accompanied Quassa to the bathing pond. Ostensibly her guard—Sankan and Gintan had already reported that the nomadic Silent Ones were marching—the tall young man let the serenity of the tree-girt pond lull him. Ears that should have listened for a stalking greatcat thrilled to her wordless hum. Eyes that should have probed the fleecy clouds for a ravagerbird devoured the smooth, sleek curves of her back. When her sudden glance caught him unprepared, he grinned, and, half in jest, squared his shoulders.

A gruffness, like a predator's growl, called his name.

Yes, Father?

You're here to protect her, not to dream about fucking her. Wake up before it's too late.

Yes, Father. He was grateful that his bushy red beard concealed his burning cheeks. His father's amusement had stung, even though the reprimand had been warranted.

I apologize, Yaran. A whispiness, dry as grass burned by summer's heat, sounded behind his words. *As your grandfather is reminding me, I too was obsessed by sex at your age.*

Grandfather pushed through to Yaran to add, *At any age, he means.*

Arms folded across her breasts, Quassa faced Yaran. Wavelets lapped her navel. Stifling gay laughter, she inclined her head, amused at the exchange.

Yaran shrugged, too unsure of her affection to offer a witty rejoinder. Then his eyes caught a flicker and his reflexes

shouted *Down!*

A thirty-foot shadow darkened the waters. Inhaling sharply, she submerged; her long black hair floated on the surface like a tangle of waterweed.

The raverbird still swooped, its blood-bedazzled appetite convincing it that Quassa was suitable prey. With talons that could encircle a small tree, and a beak that could snip off a grown man's leg, it was the only avian Yaran's people feared.

His hands trembled as it plummeted. Sunlight, winking off its harsh blue and gold feathers, transformed it into a falling firebrand. The stench of his own nervous sweat filled his nostrils: He let the arrow fly.

The stalk squalled. Flaring its wings to brake itself, it twisted its long neck into a loop. In the moment before it died, it stared in bewilderment at the grey and white fletching that protruded from its chest. Then it settled onto the water as lightly as a wind-lowered leaf.

All right, Quassa. His arms dropped to his sides; the bow slithered out of his slippery left hand. While her hair writhed, fanned into a V aimed at his heart, and curved behind her rising head, he asked, *Father?*

It was well done. His tone was the measured one he used when he rated the performance of the Hunt Groups. *Inwardly, though, you didn't trust yourself. Hunters will notice it... and lose confidence because of it. You need more practice.*

I need a friend to shoot with.

Well, there's—

A bond friend.

He murmured, the soaring and swooping equivalent of a shrug, *You'll find one when your second child is born.*

By then I may be too old to roam the woods.

Enough. Take care of your woman. I'll talk to you later. Abruptly, his presence removed itself. Neutral silence filled its wake.

You placed your arrow well, Yaran. Quassa's thoughts, though shaped according to ritual, ran across his mind like stream water over stones. She didn't scoff at him for being different; she was different enough herself.

Torn between two conflicting desires—to whoop with joy, and to behave as the Hunt Leader he hoped to become—he could only smile and shuffle his feet. For all the hours he'd spent with Quassa, delighted surprise paralyzed him whenever he especially pleased her. Beaming, he retrieved his bow, nocked another arrow, and ostentatiously surveyed the horizons.

The water was too shallow for her to swim any closer. Resting on the sandy bottom, she studied his face, then pushed herself to her knees. His throat tightened as her firm breasts came slowly into view. He tried not to stare, but his hungry eyes would not leave the pinkness of her nipples. When she lifted her slender arms to wring out her hair, her breasts rose and her brown belly flattened. About the swell of her hips, broad enough to give many children and many link-bonds, played shimmering water. Through it he could see the black triangle of her pubic hair. *Do you like what you see?* she asked archly.

Y-yes, he stammered, shifting his weight as his loincloth grew uncomfortably tight. Once he'd scanned the immediate vicinity, he lowered his bow arm to conceal the swelling at his crotch. Blushing furiously, he added, *You're very beautiful.*

Thank you. Hands still behind her neck, she swayed to her feet with a single lithe motion. Seductive eyes, like teasing hands, touched his open mouth, his feverish skin, and his

sweat-beaded forehead. Humming an ancient lovers' tune, she approached. For the second time in ten minutes, his bow landed softly on the feathergrass.

A grating voice demanded, *What the hell do you think you're doing?*

He froze. A sheepish smile automatically twisted his lips. *I... I'm not sure.*

His father's snort broke the spell Quassa had woven. He hastily grabbed his bow, bruising some feather fronds with his fingers. Their faint, musky scent rose all round him.

I'm sorry, Father.

I suppose you couldn't help it. The grizzled hunter made a sound of quiet appreciation. *She is a stunning woman, Yaran.*

I know. With regret, they watched Quassa reach for a drying cloth. *Father, he burst out, when?*

Soon, I hope, but you're not ready yet.

Father, I am. He had to be. He was the oldest unmarried man in the tribe, and his growing isolation hurt.

Knowing sympathy swirled around him. *Not yet, Yaran. The shell is gone, true, but the mind behind it...*

What about it?

It's still too yielding.

What do you mean? Angry, for in other respects he was a man of twenty-three summers, he edged his thoughts to insist upon proof. That was his right. OldHome laws said no adult could be coerced without due process.

Feel. His father's mind enveloped his, hesitated while it hunted, then settled on his virginity. Yaran shied away. *Hold still, dammit.* He set his jaw and submitted to the blunt prodding. It shamed him, for it felt like a strangely greedy man was caressing his genitals. *I'm about to begin, so observe closely.* A pressure approached the sensitive wall of his mind. Gradually, it intensified, bulging the wall inwards as though it were an elastic membrane. While it swelled, Yaran's thoughts scattered. He dropped to the ground. His hands fell onto his soft leather loincloth and discovered his erection. Then the pressure ceased.

That's where Quassa's mind will enter yours on your wedding night. His father clucked unhappily. *You felt the resilience?*

Yes. Letting his head drop seemed to disperse the dizziness.

Before I agree to the marriage, the fabric across the opening must thrum to my thoughts like the skin of a drum. Otherwise Quassa, even with all the tribe behind her, won't be able to penetrate.

How long?

A month, maybe two.

Father, I can't wait that long. To talk to his love while his parents listened was becoming unendurable. He needed privacy, and security.

His mother blew through him with the brisk cleanliness of an autumn wind. Her ability to find the undisputable core of any problem was one reason he loved her. *You have to wait. Unless you'd rather be like Nimlan.*

I wouldn't. Nimlan's bride, Hassa, had been unable to enter his mind. After twelve hours of what Yaran had just experienced, he'd passed out. Hassa, still potent because the arousal of deforation could not subside until she'd broken into a male, had left their tent. In the bushes by the creek she'd met the widower Fegran. Less capable of restraint than a bitch in heat, she'd copulated with him until their thoughts were as mutually clear as air. They had returned from the bushes hand in hand, mind in mind, husband and wife.

Nimlan had hung himself an hour later. *I've always wanted to ask*, said Yaran, edging the topic away from his deepest fears, *what happens to a parent when his child dies?*

He loses the line to the child, of course, answered his mother. *But as you know, the companion line stays open.*

And if the bond-brother dies? He crushed a piece of feathergrass under his nose, and pretended its perfume was Quassa's.

Silly. His mother was impatient with slowness. *The line stays open until a new brother is bonded.*

That's right. He nodded, more to himself than to her, though if she were in full contact she would sense the bobbing of his head. *I remember now.*

Good. Now, this foolishness with Quassa—
He was instantly hostile. *Yes?*

Don't lay with her until the wedding, which, I promise, will take place the night you're ripe. Her voice eased its efficient rush to hug his mind. *Yaran, I listen to your thoughts; I know your desires. I do not condemn you. Every man who has hunted the forests has experienced them. But you must hold them in check until they will do good, rather than harm.* Her tone shifted back. *I spoke to Quassa's mother; she's planted in Quassa the yearning not to tempt you. Discuss with your father whether or not he should do the same to you. My kiln is overheating.* With that, she was gone so completely that he could have thought she had never been, were it not for the thread of affection that still joined them.

He looked over at Quassa, curled in the grass some five feet away. The sultriness had evaporated; her return stare was childishly innocent. Her new posture had cooled the effect of her clothes. The dappled blouse was no longer taut against out-thrust breasts; the leather skirt now emphasized the girlish fragility of her waist, rather than the powerful muscles of her hips and thighs.

She smiled shyly, saying, *I shouldn't have done that, and I'm sorry. I won't do it again until our wedding night, all right?* Her words came singly and clearly; their suggestive nuances had been eliminated. It was the same lucid voice in which she explained things to her pupils.

Sure. He fidgeted in discomfort. She may have lost awareness of the power of her body, but he hadn't. Not yet. *Are you in a hurry to get back?*

No.

Good. I have to talk to my father.

For just an instant, her eyes flamed, as though enough of her had eluded her mother's molding to be indignant. But then they darkened, and she said, *Fine.*

Father?

Are you ready?

Yes. He grimaced. Do your stuff.

Not so quickly, growled his father. I want your cooperation.

Yaran's laugh was bitter. Do you need it?

It would let me plant a more subtle, a more qualified wish in you. His father, who painted when not hunting, relished simplicity and understatement.

So?

If you resist me, I'll have to force my way in. The result will be flat and heavy. That's obviously what Quassa's mother did, and look at the girl now! His ruefulness suggested that he preferred her unaltered. Her songs won't be worth listening to for months.

I noticed. What did she do? Picking up a crystal pebble, he raised it between his eyes and the sun. Dried clay coated several of its facets.

If I know her, she molded Quassa into thinking, 'I want to be sexless'.

And what do you want to mold me into thinking?

How about, 'I want to abstain from sex until my mind can be penetrated by Quassa'? Think that'd be sufficient?

Why so complex? With his thumbnail he scraped off the clay; beneath it, the clearstone was slick, almost greasy. Perfect. He'd give it to Quassa, who'd turn it into a trinket for the children she helped educate.

Recognizing that Yaran was contentious because he didn't know how else to behave, his father merely sighed. *A mind blanket would work as well, he began, but... you see, Yaran, I'd have to keep testing to determine if you were ready, and then start a second yearning in you when you were. My formula is self-limiting; when the proper conditions are met, it will fade away like winter snow.*

That's nice of you. He peered through the crystal, which fractured the sunlight, and distorted Quassa's body into shapes he didn't ache for.

Yaran, you're sullen because you think I take pleasure in this. But why should I? A human soul, like water, cannot be permanently shaped.

Ice can.

Ice is not water, ice is ice. In the same way, when I wish an ideal human, I paint it on hide. I mold you for your own protection, Yaran, not for my pleasure.

All right, all right. He let the reverberations of his disgusted gesture flow through the line. *Get on with it.*

Very good. Close your eyes. He paused. Now, think of the wind, brushing your face with its fingers.

When his father's mind drew closer, he leaned back. The sun gave its warmth to his cloak, and thus to his powerful body. His muscles relaxed. A familiar presence filled him. For a moment his angered thoughts arrayed themselves in tight, unbreakable patterns, but his father soothed them with a skillful massage. Chains of ideas separated, and drifted randomly; the intruder, careful not to startle them, moved through their midst like fog through a forest. He reached his goal, and with cautious scratches prepared the ground. The words "I want to abstain from sex until my mind can be penetrated by Quassa" took root. Competent hands nourished them, feeding them life and meaning until they pulsed in time with the others. The artist, ever critical, added here and subtracted there. The desire was strong now. Roots and stalk withered; a fingertip shivered them into dust and the thought floated up to join its blood brothers.

Well?

It wasn't as bad as I thought it would be, admitted Yaran.

Of course not. You cooperated.

But the last time...

Thirteen summers ago?

Uh-huh. Ostracized by the other children because of his terror of the forest, he'd begged for the change... and then fought its installation every step of the way.

You were younger, less able to provide a rational framework for the superimposed desire. And your fear of hunting was very, very strong.

But my sex drive...

Was a hunger, not a fear. Fears are more powerful. The last time, I had to use all my strength to alter you.

Well...

I must go. I'll talk to you later.

All right. Contact severed, he sat up. Quassa lay as she had before the operation had begun. The translucence of her skin

His mother's line burst into life, and throbbed with fear so violent that its giant hand squeezed his lungs. No words came—just blind, cowering terror that made him hunger to shield her.

was abstractly rewarding. His eyes traced her high, soft breasts without growing hot. When she took his hand, only friendship passed between them, as though he were one of her younger students. A wry smile on his face, he shook his head and started back to the village.



HEY WERE SCRAMBLING over a fallen needle-tree, with grey carpetmoss crumbling beneath their fingers, when Yaran's father broke into their conversation.

The Silent Ones attack; put Quassa in a place of safety and hurry to the village. The Chief will instruct you.

Would they never give up? The Silent Ones invaded whenever their ranks seemed full enough to promise success. The years between battles meant nothing to them, nor did their inevitably heavy losses—they behaved like mad nightcats.

Their line had been pre-empted, but Quassa's worried face and fearful eyes told him she had heard. Touching her shoulder, he pointed to the log, and began to dig in its shadow. She watched blankly for a moment, then understood and stooped to help. The smell of rot strengthened. Moist dirt flew; annoyed woodworms scattered. Shellcrackers swooped from the surrounding branches to peck warily at the defenseless insects. When the hollow was deep enough, he seized her muddy hand and motioned her to lie down. His hacking knife reaped a pile of ropevines—strewn over Quassa and the log, they provided satisfactory cover.

Well done, Yaran, wheezed the Chief. Kaleidoscopic flashes of landscape, interspersed with the dim interior of his headquarters tent, accompanied his words. Every line in the tribe was open and at his disposal.

Thank you. He sheathed his resin-sticky knife and reached for his bow.

Go quickly to the top of the hill. The Silent Ones come from the south. Work your way behind them—most carefully—until you are within bow range. Then place your arrows well.

Sir?

Yes?

Sankan?

Dead... Gintan, too. Avenge them.

Yes, sir. Eyes slashing from side to side, sharp for any sign of the enemy, he pounded up the hill. In most places, the woodshorse trail was hard and bare; he could take the rise at full speed. Dust in his nostrils made him sneeze.

Yaran—first battle? asked the Chief. *Oh, don't slow, keep running.*

Yes, Sir.

Unh. Then know that when one of the tribe eyes the area where you will fight, I will pass the picture on to you.

Thank you, sir. The Chief, far too old to fight, sat in his tent and watched the battle from a hundred viewpoints. Immediately aware of every shift and surge, he could shuffle his warriors to reinforce defenses and launch counter-attacks,

Kevin O'Donnell, Jr.

More, he could let his tribesmen see what was happening outside their private struggles, thus preparing them for what might take place in the next moments.

The scene lurched. He was suddenly outside the village, gazing south across the valley floor. Scores, perhaps hundreds of the lank Silent Ones were engaged in hand-to-hand combat with the Mind Meeters. Dozens more loped through the meadows, and raised spearheads rock-ugly in the sun. All were daubed with clay, in patterns whose meanings had long been forgotten. The most common looked like †.

The overlaid sight was so vivid that he lost the trail and tripped into a clawbush. The valley blinked out. *You'll get used to it, Yaran,* promised the Chief.

Thanks. On his feet again, he raced for the crest.

His mother's line burst into life, and throbbed with fear so violent that its giant hand squeezed his lungs. No words came—just blind, cowering terror that made him hunger to shield her—till the Women's Chief wriggled through to say, *Your mother has trouble.*

The Silent Ones?

Yes.

Rape? That was what they most feared, for Silent Ones fathered Silent Children.

Not yet. She moved in Yaran's mind to grasp the line. *I'll try to dampen it.* The fear dwindled to a trickle; the little that still emerged changed somehow, and became a spur in Yaran's side. It drove him at a pace faster than he could have attained on his own. *Your mother is powerful,* commented the Women's Chief.

Huh. No time for speech. Throw the leg out, bring it down, toe touches, pull, bunch, *push*, do it again. Again. Hilltop, cross it in ten strides.

The Chief's hand retreated. Rage poured through the open line. Stronger and clearer than the fear, it cast images of broken-backed rats and castrated prisoners. Around the edges of the vision, knife in teeth, danced a shadowy, howling form: his mother.

More trouble. Deft fingers twisted the emotion, kneading, stretching, offering it to Yaran as though it were his own. The ground fell away. Precariously he shambled down for twenty yards, then grudgingly slowed because he couldn't risk damage to his weapons. His heart thudded with hatred—not fiery and crippling, but icy and calculating.

The hillside was blotted out by an intenser sight, one rimmed with hazy red. An oaken shaft led away from her/him to a grinning, clay-smeared Silent One. A hide wall billowed in the background; the drawings on the bleached leather were familiar. The tent reeked of feces. By the door, sprawled and bleeding, lay his younger brother. Then the pain blasted through and she/he grabbed the spear/a passing tree and threw back her/his head and screamed and screamed and—

Unh. A huge blanket smothered the agony. *I should have been quicker.*

Bark craped his eyebrows as he moved his head. *My*

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mother?

Dying.

Mother? Whimpering, he lifted the blanket and reached along the line. Her weakened mind was spiraling down into darkness, like a chip of wood caught by a whirlpool. She felt no pain, on'y peaceful reconciliation, brightened by a spark of anticipation. *Mother!*

Hush. The Women's Chief eased the blanket from his fingers. *She must go.* Then the blanket disappeared and the line fell into glistening motes that hung for a while before melting into deep, silent blackness. His mother, who banded wounds more tenderly than anyone, who threw pottery so beautiful that fire soot seemed a desecration, was dead.

Yaran. The Men's Chief was impatient. *Move!*

A gulped/sobbed breath. *Yes, sir.* The forest was thinning out; he could not continue his headlong rush. Crouching, he moved on hands and knees. Somewhere ahead was—

Good God! His father's choked surprise. The Chief's relentless hand squelched the emotion of the message.

What happened? he demanded.

Ambush, snapped the Chief.

Fifty feet away, a tall, green-streaked Silent One attended to his squealing companion. Cold and angry, Yaran searched for others, but found none. He took two arrows, knocked one, let it fly. Green Clay stiffened, clawed at his hairless chest, and toppled over backwards. The injured one got to his awkward feet just in time for Yaran's second arrow to hole the middle of his back.

Good work.

Thank you. He scurried past the bodies without a second glance. Ahead loomed a small group of panting warriors; he wriggled close enough to count their bony ribs. Chin barely above the windtossed tops of the high fronds, he balanced himself on his knee. Past him swept clouds of feathergrass perfume, darkened by hints of bloody sweat. One arrow hummed, then another. Two enemies tumbled.

Oh shi! His father's anguish broke through the Chief's barrier. Pain burned in his gut, like an ember in the palm when you pull a log from the fire. But this couldn't be thrust in a water bucket, or coated with catgrease. It went all the way through, flayed on both ends by the bitter wind, charred in the middle, leaking blood.

Hold fast, Yaran, they're starting to retreat. Pick them off as they pass you. The Chief manipulated the line and diminished the pain. *For your parents, boy.* Behind his words beat another man's grim determination: from its texture, Yaran's father's.

Yes, sir. Down the slope, the Silent Ones were falling away from the village. Some, bloody and moaning, stumbled off under their own power. Others hung from their comrades' shoulders, or swung on improvised litters of spears and blankets. Behind them prowled the men of Yaran's village, isolating small clusters, annihilating them. Yaran waited till the distance was right, then loosed arrow after arrow as quickly and as efficiently as a well-trained Hunt Group. He stopped only when every invader in range was covered with buzzing blackbugs.

Would they never learn?

WEEDS PASSED LIKE SMOKY MINUTES. Yaran stayed at one side of his father's pallet; his grandfather claimed the other. Cross-legged on the beaten earth, each held one cold hand and willed him to

live. Each needed him in a way too deep to verbalize.

Though Grandfather's stamina was remarkable, the vigil had eroded his salty good humor. In its place alternated sullenness and sardonism.

This is like pissing into sand, boy, he said to Yaran. *All the strength we pour into your father soaks right through without changing a damn thing.*

He's still alive, isn't he? snarled Yaran. He'd lost close to thirty pounds already, and reeled dizzily whenever he stood up.

Grandfather's finger, a skin-wrapped bone, tapped the invalid's head. *Call that living, do you? Inside of his mind sounds like a campfire. Those crackles and snappings don't mean a damn thing, y'know.*

Grandfather. I know. Wearily, he rubbed his temple with his left hand. *I can hear it when we talk to each other.*

Damn hard to hear anything else, grumbled the old man. *Pity we've got no other way to talk.*

The line they used—the last link between Yaran and the tribe—stretched through the feverish jungle of his father's pain. Wild thoughts, chasing each other's tails, sliced into it a dozen times a minute. Brief insights arced through the watchers' minds like shooting stars. Yaran had heard his father beg for death a thousand times, yet every instance had been balanced by a vow to live. *I will live,* ran the chant, *let me die. Free! I must live. Die. My wife, my poor poor yes, I will, let me go, free live free die, wife and child hunters call. Oh the fucking pain let me die! I cannot die, I must not die, I must my wife my beauty my die.* Constantly beating, crossing, and exploding in Yaran's head, they lighted a terrain he'd never explored.

Yaran. A hand on his shoulder, and a new voice distorted by his father's mental state. *Is there change?*

No, Aunt. He laid the side of his head against the smooth, soft wrist of his mother's younger sister. *No change at all.*

Will he regain consciousness? The timbre of her words ghosted through him, moistening his dull eyes with its echoes of the dead past.

I don't know. He squeezed the fingers in his palm, and smelled again the acrid poultice. How had they forgotten the OldHome medicine? It would have had his father healthy, hunting, painting. . .

We can't attempt the replacement without him.

I know. A flat, bleak response. His aunt could re-open the link that had vanished with his mother, if his father could awaken and assist them. If not, then that side of his mind would be forever silent.

The hand stroked his long red hair, stringy and greasy from lack of care. *I brought food for you and Grandfather, and broth for your father.*

Thank you, Aunt.

Will you eat it? Anxiety made her voice skip. *You can't help him if you don't keep up your strength.*

I know. Not hostile, merely resigned. Food. . .probe the depths of an agony that borders on madness and still have an appetite? The soup was warm and spicy, but free of tidbits that could clog a sick man's throat. He began to spoon it into his patient.

You do that well. A final pat to the top of his head, then her sandals scuffed across the floor and the hide flaps swished at her departure. Outside, under the three clean moons, she paused to repeat: *If there's any change—*

Call you at once, I know. And. . .thank you, Aunt.

Silly woman, snorted the old man. He reached across the

TUNNELS OF THE MIND

pallet for a plate of fried vegetables. *Good cook, though, I'll give her that.* He chewed, licked his fingers, and picked a crumb from his scraggly white beard. *Yaran.*

Yes, Grandfather?

I suppose y'know he isn't going to make it.

Hot protest spurted within him, but fizzled into sorrow—and fright—before it could find an outlet. *You're probably right.*

I am right. I've spent enough months at bedsides like this: I can tell. His clouded eyes peered through the tent's darkness. Have you made your escape plans?

Huh?

Escape, boy. He waited for a reply, but none came. Don't y'know what's going to happen to you when he dies?

I haven't been thinking that far ahead. The hollowed-out bone slipped in his fingers and splashed broth onto his father's upper lip. Cursing his clumsiness, he mopped it up with a filthy cloth. So tell me.

When he dies, you lose your last link with the tribe. That puts you on a level with the Silent Ones. I don't think they'll kill you—course you could ask 'em to, if you want—but they'll damn sure chase you out of the village.

So? How could he, a deaf-mute, hope to share in tribal life?

Naked and unarmed. Won't stand a chance. Resentment heated his words. Grandfather had always believed in fair fights.

Oh. He wouldn't. The nightcats would get him before the sun had fully set. If not them, then something else. A very solitary way to die.

Ah, you see my point. When he dies—again the skeletal finger tapped the man on the pallet—take your weapons and clothes, and run. I'll be able to cover for you for a while. By the time it's discovered—

It won't work. Yaran, broke in the Chief. I've been listening, both to your father and your grandfather. Guards have been posted to keep you from stealing tribal property. I regret that... but it's the Law.

Tyman, expostulated Grandfather, why don't you take the Law and—

Silence! The Chief could not abide obscenity. My decision is final.

Some minutes later, Grandfather muttered, *Sorry, boy.* The old rebel had been chastened by the knowledge that he was too old to rebel. The fight had seeped out of him, and all he could do was mourn its loss.

Yaran shrugged, and spooned more soup between the lifeless, bluish lips.

If Yaran's days had been debilitating, his nights became intolerable. He made do with as little sleep as he could—took it only when fatigue forced him to the floor—but still the nightmares came. Memories of exiles he had witnessed slithered across time to breed with his fears and spawn monsters:

—From the fringe of a blurred crowd, he watched an emaciated, red-bearded man be divested of his clothes and his weapons. He turned to ask his neighbor why the spearmen were driving the gaunt youth from the village. Silence lay between them. Alarmed, he raised his thoughts to a scream. Uninterested, unhearing eyes swept his face and traveled on. He reached out to touch the other's mind, but no matter how far he stretched he couldn't find it.

It was snowing in the midst of the circle. He shivered as taloned fingers plucked at his cloaks. His toes were numb and

the snowflakes no longer melted on his shoulders, but it he asked the reason why, no one would answer. No one would hear—

His grandfather's voice, drier and scratchier as the days took their toll, would call to him, *Yaran, Yaran, it's a dream, wake up, it's a dream, wake—*

I am awake. He'd heave himself into a sitting position and cross his legs. His eyes burned and his head lolled. His father's hand lay in his like a bundle of sticks, sometimes warm, sometimes icy cold. Live, Father, live, he'd urge.

But the mind in the dying body would rumble and groan and contradict itself. The hunter-warrior-artist was prey to too many desires. The linkage through him was ever less reliable; messages arrived with whole sections missing, obliterated by the madness through which they had traveled.

The tribespeople began to pay their last respects. Squatting on their haunches, they'd murmur soft thoughts while they stroked the feverish brow. Helpless sorrow in their eyes, they'd clasp Yaran's hand and wish him luck. Their kindness only emphasized his isolation. When there was nothing to say that they hadn't said six times over, they'd take their leave hesitantly, with many a backward glance.

Dammil, ranted Yaran, after the eighth visitor of the day had finally shuffled out, why can't they wait? Vultures, all of them! Hovering while he tires, hoping he won't make it. Why can't they wait?

That's the way of things, mused Grandfather philosophical. They know you, Yaran, and they like you. But they also know the Law. So they come by to express their regrets, to tell you that it's nothing personal. Hmm?

Why is it the Law? His spine bent until his forehead neared the floor.

Don't be a fool, grunted the old man. It's plain you're not happy, and it's understandable, but you know why. No Silent One can be a Mind Meeter. How'd he speak? How'd he listen? At best he'd be a blank; at worst, a weakness, a soft spot in our shell. No. The Law is harsh, but wise.

When Quassa came to offer her condolences, his father's beaten mind was beginning to whirlpool. She knelt at the pallet's foot and tossed her thoughts into the line for Yaran to pluck out as best he could.

...unhappy for... life is ru—...teley wrong... with you when... Oh, Yaran... heart's tears...

Huddled into himself, listening to his father spin round, he clenched his fist. Twenty minutes before it would be over. His heart was pounding. *Father!* The hand he gripped was a cold claw, but no colder than his own. Twenty minutes and that good-natured gruffness would be gone forever. Forever made him shiver. His stomach was a tight knot, and hurt, badly. Twenty minutes and he would be cast into eternal silence...lonely exile...agonized death. *Father, don't!* Tears ran from his eyes, down his cheeks, onto the man who, like a lightning-struck tree in the forest, would take at least one other with him into death. And Yaran's terror could not stay his headlong plunge.

A hand touched his knee; a head rested on his shoulder. A long moment passed before he became aware of them, and turned to see they were Quassa's. Her reddened eyes reflected his misery. The scent of her scrubbed hair flooded his nostrils. Pain for all the things they would never share tore at his chest.

He didn't want death—silence—even loneliness. He wanted friends, and laughter, and love songs late in the

[continued on page 73]





THE LEGACY OF JOSEPH PENN

M. Lucie Chin

WHAT DO YOU SEE IN YOUR SLEEP?"
"Myself."
"Why does it bother you to dream about yourself?"
"I do not dream about myself."
"Perhaps it *seems* not. What bothers you then?"
"It's confusing, like being a hundred people all at once..."
"And...?"
"...they are stronger than I am. They don't seem to know I exist... but I feel swallowed up. I can't fight. I'm too tired."
"Alright." The man beside the bed took a small box from his pocket. "Take these. There'll be no dreams tonight."
A hand accepted the two dots of relief, conveyed them to the mouth where they vanished. He did not raise his head nor open his eyes.
"We will monitor but I won't wake you again."
A nod. No reply. The body slid slowly onto the left side, dragging the pillow with it.

George Willis closed the observation room door, put the recorder on the shelf and poured a mug of black coffee. He did not look at the graphs rolling steadily beneath busily

Cortney Skinner

scratching pens side by side by the window. Edith was doing that.

"Did you have to give him those?" she said moving slowly along the row, not looking up. "He was practically asleep before they were into his mouth. I've never seen anyone so tired."

"Precisely the point. He needs rest, not just sleep."

"Does he know what he's saying?"

"I don't think so. He certainly isn't making sense and he looks like death warmed over. Loren, how could you let him get that bad?"

"He didn't ask my permission." Loren Johnson muttered. He sat on the edge of the desk stirring his coffee with a tongue depressor. "It hasn't been a week, George. He wasn't this bad in Albany."

"We plugged him in about 8:30 Monday night. He muttered and tossed in his sleep for the next three hours. That extreme degree of physical and vocal activity are definitely not symptoms of dream level sleep, yet his brain wave pattern said he was not *deeply* asleep."

"About midnight he began to drift down toward fourth level and went through fairly normal cycles till 6 a.m. His last two hours were like the first three. From our point of view it was fascinating. Not from his. He was very upset."

"Things got worse after that. He took tests and worked pretty hard the rest of the day and took a nap around 4:00. He started muttering and tossing again and an hour later Annie called me. He was *extremely* agitated so I woke him."

"He was a mess. Terrified, disoriented, completely unable to relate lucidly anything he had experienced during sleep. It took me five hours to get him calm. He wouldn't take any tranquilizers and he refused to go back to sleep. He didn't, either, till late Thursday when he was too tired not to. He's fighting this so hard it's becoming a vicious circle."

"But you say he's not dreaming," Edith said, drumming her fingers on the window sill.

Loren shook his head. "Everything is wrong; heart rate, respiration, temperature, no REMs, the serotonin level is too high, LC cell activity diminishes only slightly and the pontine cells remain relatively inactive. In some ways his behavior resembles that of lab animals when the REM state inhibiting mechanisms are disabled and in other ways he resembles an REM deprivation subject. Totally dichotomous conditions."

George heaved a sigh and his middle-aged bulk onto the other corner of the desk. "This doesn't exactly sound like my forte," he said.

"Maybe not yours but some of your people, perhaps. There are no controls I can impose here that you can't. I'm at my wit's end. You see, I think it's a larger problem than a dream."

"Oh?"

"We are fairly sure that we can, to a degree, control our own dreams. In an extreme situation it may be possible to control the dreaming *processes*."

"You think he's doing this himself?"

"Not intentionally, but I can't help feeling there is something else underlying the more obvious problem. I'm convinced till that is addressed nothing much will help."

George nodded. "Valid point. I'd like to talk to him in the morning."

"Fine."

Edith was still drumming but she was no longer following the undulating roadways leading outward from the mind. She was trying to find a focus for something she should know.

"What do you know about him?" she asked.

"We met in Chicago before I came out here to the Dream Lab. He lived in the apartment next to mine. He's a nice kid and we became friends."

Loren caught Edith's eye and grinned. "Never mind that I'm 12 years his senior. We were both single men about town with similar tastes."

His expression changed again. "Martin is really a very lonely man. He knows a hell of a lot of people but has few friends."

"He said just now that he is besieged by a feeling of losing himself in a hoard of people," George mused.

"Yes, there seems to be a strong conflict between this innate herd instinct and a need to be himself."

"Could he simply be looking for attention?"

Loren shook his head emphatically. "This is real enough in its way. How, after all, can you measure the reality of a dream? Content? REMs? We still don't know what happens to the sleeping mind, though we have a better idea about the brain."

"We used to talk about it some. They were about as bothersome as any recurring dream. When I left Chicago I told him if he ever felt like getting into it to look me up. We corresponded. Then he moved to Albany and I began to hear from him often. About a month ago he called and asked if I could take him down here for a couple of weeks. He wanted to use his vacation to try to get this monkey off his back. I didn't promise anything but I agreed to see what we could do." He waved a hand toward the window and gulped warm coffee. "There you have the results. It's why I called you two. He's my friend. I can't just cut him loose to crawl away and go nuts. Maybe your people can do something. I'll pay his bills, if need be."

"We'll do our best, Loren."

MARTIN COREY SAT IN LOREN'S OFFICE, rested and slightly bitter, waiting. Loren had not come right out and said he needed a shrink but he suspected that was who these new people were. Miserable as he was it was still a blow to his dignity. He had come for help. What he had gotten was pure misery. Perhaps Loren was trying to bail him out. He hardly cared. They could do what they like, all he wanted was to sleep like a normal human being.

The door opened admitting the smell of coffee and the bright "Good morning," of a male voice. The pair who entered looked much alike; roughly the same features, proportions, and coloring. One was a round matronly woman with the sort of wrinkle-free prettiness of face the plump often have, tempered strongly by a sharp-eyed alertness. She wore tailored linen and her graying hair was very short. She looked amazingly fashionable for someone of her dimensions. She also looked like a person with whom one did not mess. The man, in shirtsleeves, was a bit older, perhaps, and rather mellow in expression but enough of the authority figure in his own way to assure one that, though the two might travel different roads, they ended up in the same place.

Edith Willis introduced herself and her brother George as she took over the desk, indicating that Loren had asked them in because he felt the need of an unbiased opinion on an admittedly difficult problem.

Martin had nothing in particular to say. It was their interview but so far they were doing nothing but looking him over while George poured coffee. Edith Willis was rather

more direct in her scrutiny than her brother but that appeared to be the major reason she was there. She said nothing more and Martin said nothing. Finally, George took a seat and began asking questions. Martin answered in monosyllables as much as possible till George finally said, "Loren doesn't know much about you before Chicago. How about some history?"

"I was born in Philadelphia or somewhere near there. Is that far enough back for you?"

George caught the edge in Martin's voice but let it pass with a nod and a smile.

"We moved to Indiana when I was a few weeks old. My father was a dentist. My mother had been a pediatric nurse, I think. She didn't work while I was growing up."

Martin droned on through a singularly uneventful account of life in the rural mid-west. He had gone to the University of Indiana, majoring in business and computer sciences, then to a software house in Chicago. The relationship with his parents had been good. They were loving, supportive and encouraging, trying to instill from childhood a sense of self-reliance and worth. They had apparently perceived as a basic gregariousness his growing compulsion to surround himself with increasing numbers of people. That need had somehow peaked in Chicago. He had gone to Albany for career reasons. He did not mention the dreams.

Edith, however, did not miss a persistent past tense in his narrative. "Do you go back to visit often?" she asked casually.

"I'm an only child. My parents died in an auto accident three years ago. I was in Chicago. Loren had just come out here."

Martin looked from Edith to George, then down at his three-times-empty cup. He was feeling less petulant and his conversation had loosened up considerably. They weren't such bad sorts to talk to, he decided. He was beginning to feel like telling them things.

"I guess I felt deserted," Martin said to his mug. "The only people I really cared about had left me... I guess that was kind of childish."

"Not at all," George said quietly.

"Well, all of a sudden lots of things just didn't matter any more. So when this job came up I took it. Maybe I wanted to be closer to Loren. I don't know," he shrugged, "it seemed like a good idea."

"That's when the dreams got really intense."

He looked up and smiled for the first time. It was an odd smile on the gaunt face. None of it showed in the dullness of his eyes. George wondered what Martin would look like if he really smiled. He was 26 years old, blue-eyed, auburn-haired, and slightly dark complexioned. There was no alertness in him anymore. The lines and planes of his face seemed immobile. Real eye contact was difficult. Except for the momentary smile, his mouth tended to form itself into a hard, straight line, an unnatural line for a human face.

"How did the dreams change? What were they like before you moved to Chicago?" Edith was saying.

"They are so hard to describe. I don't see anything in my sleep. I don't hear anything either. I just sort of know things or feel things. But that's not it. It's hard."

"Don't worry about that now," George said, seeing Martin's brow knit into deep furrows. "When did they begin? In college?"

"Hell no," Martin said with a slight, humorless chuckle. "I've had them as long as I can remember. Since childhood."

They always seemed to happen in the morning... just before I got up, a really strong *deja vu* thing, though I didn't know what to call it then. It was like getting up, having breakfast, starting school with this terribly vivid recollection of having already done it, but not yesterday... only, say, an hour before. I didn't have it all the time, but enough that it didn't seem strange. I thought everyone was like that.

"Things got complicated in college. Each time it happened it was as though I had done it many times, overlapping each other, but not all alike."

He stopped and sighed, looking into his mug again. George reached over and filled it with the rest of the pot. Martin drank it black and at any temperature that was handy. He took half the mugful in one swallow.

"I got to Albany and right away things weren't good. I thought it was the move. I'd never been East before, never worked for government. The department was a mess, the survey was disorganized, the mover lost a bunch of my stuff... and the dreams were different." He shook his head trying to think. "They were compressed, crowded. I was having them at night, too. It was like all of Chicago had followed me and crowded into my head at night and I was afraid of being absorbed and never knowing who I was any more. I felt I was one of them but I was afraid to be. I had to try as hard as I could to separate myself from the *feeling* of them. It got so bad I finally called Loren."

"And now?"

"The same, only worse. That sounds dumb." He smiled again.

"Not really," George said. "I just have one last question."

"Sure," Martin mumbled dropping his head, massaging his temples.

"What did you mean when you said they are not dreams?"

"What?" Martin looked up. Their eyes made real contact at last.

"Yesterday, when you first saw me, I said 'Why does it bother you to dream about yourself?' If these are not dreams, Martin, what are they?"

"I don't know," Martin said, his eyes growing troubled. "I don't know what I meant. I don't remember..."

"It isn't important," George said, "We'll get to it eventually. If you would like us to try to help you, that is."

There it was. Martin drew in a deep breath and sat up straight. "I know Loren has done all he can," he said, "and someone has to help me before I go nuts."

He looked from George to Edith and back. "Am I crazy?"

"I don't think so," George said quietly, "but you aren't doing yourself a great deal of good for some reason and we're going to try to find out why."

Martin looked unconvinced but he nodded. Edith Willis sat silently behind the desk still trying to decide what she was looking for. It bugged her, and when Edith was bugged she was relentless. She would find it eventually.

That evening Martin Corey was in Manhattan and his life had taken one more long step further from hope. George and Edith watched him as he sat in the car riding down from Westchester and saw the anguish growing in his eyes and despair settling into the lines of his face as the miles passed. It was a painful sight but not without a certain measure of fascination. As they drove into the mid-summer morning, George tried to be congenial and reassuring while Edith divided her attention between Martin's file and the torment mapped upon his face.



HREE DAYS LATER, Loren Johnson took a train down to New York City in answer to a call from George Willis. George had been cryptic and uninformative on the phone. But if it would help Martin, even a little, Loren would have gone to China on a slow boat.

The first thing he did was to stop in and see Martin. The young man was no longer despondent but Loren could hardly call the change an improvement. He was highly agitated, pacing and fidgeting constantly as he talked and looking around the room from time to time with a start.

When he left, Loren felt wretched and he found his way to George's office in the administrative wing in a blind reverie.

"He looks awful, George," Loren said entering Willis's office and quietly closing the door. "Moving him down here hasn't helped at all. He was better in Westchester."

"He was better in Albany," George said.

"I know that. I wasn't criticizing you, George." Loren took a chair across from the desk and slumped. "It's just that the more we try to do for him, the worse he seems to get. It's uncanny. I just saw him and he tells me the problem is no longer confined to his sleep. It plagues him while he's awake now."

"Yes, we noticed that as soon as we got here. Norton doesn't know what to think, and I can see why."

"You're the psychiatrist. I ran out of ideas up in Westchester."

"Clinical psychologist," George corrected. "Norton's the psychiatrist."

"How come you seem so unconcerned about this?" Loren said, a touch of pique in his voice.

"Because we may have an answer. At least Edith has an idea and I'm inclined to give it enough credence to investigate further. She left for D.C. last night to do a little research."

"Into what?"

"Edith thinks Martin is a clone."

"What?" Norton stared at him slack-jawed.

"A clone. C-L-O—"

"Yes, yes! I can spell it." His expression had changed to active confusion.

"What do you know about clones?" George asked.

"Only about as much as the average citizen. We've been cloning insulin and orchids and frogs since the last century."

"I was speaking of the human kind."

Loren shrugged. "They are no secret, at least not any more. I don't know how much of it is hard science and how much is pure journalism. It's a fascinating subject but I've never gotten into it."

George gave a wry smile as he spoke. "Edith thinks we have been administrators too long. It took her all of four days to put a shape to whatever it was that struck her that first day. Maybe she's right but I doubt I could ever have pulled that rabbit out of its hat."

"It goes back a long way—thirty-five years. It was the summer of 1929 and she had just completed graduate study at NYU. She landed a government job on what turned out to be the first truly successful human cloning project. Before that they were barely even of idiot mentality. The Downing clone was the first to exhibit truly human proportions in all areas of concern. They were also the first to display the effect we now refer to as the Link. It was probably there all along but it required a certain level of intelligent interaction to make it apparent."

"Edith's involvement with the Downing Project took place when the clone was roughly two and a half years old. It was a

four-clone by the way, and one of the things being measured was this special interaction. Something about this young man stirred that incredible memory of hers and she is certain she saw in Martin the same set of conditions she saw back then in the sleeping clones when one or two of the members were awake and active elsewhere. She still has friends from those days who have continued with the cloning projects. She took some of Martin's graphs for comparison."

"I can see where this is going," Loren said a trifle stiffly. "It could be a convenient enough answer if it weren't for one major question—How? How do you lose a clone? The assumption here must be that he is one of a set and we are dealing with a Link Effect which would be inappropriate in a singleton. Be reasonable, George, clones are hardly as common as flies, even after forty years of research. It is only for the last fifteen that they have been out from under government cover. You don't simply misplace something like that."

"True. That is one of the questions Edith intends to look into."

"No," Loren was shaking his head vehemently, no longer slumped in the chair, "I can't buy it. The circumstances are inconsistent. He's had the problem intermittently all his life, true, but if your theory was correct then why is he having such a hard time of it now, especially the last ten days?"

"Proximity," George said slowly.

Loren looked blank.

"Edith feels they are somewhere in this part of the country. Indiana is in the Central Time Zone. That could account for his early morning *deja vu*. It is also a great enough distance to weaken the effect. I don't know too much about it where distances are concerned. I must admit I am not as well versed as I may have to become if this proves true, but I see his coming East as an obvious corollary."

"If you accept the original premise."

"True," George said. "Granted we don't know enough yet. We are speculating, but the possibility has too much promise to ignore. In a way I hope she is wrong. We still know too little about them, how they interrelate mentally, emotionally, how they relate to themselves as human beings. We may be embarking upon uncharted waters. In many ways it is vastly exciting, and in others..." He shook his head slowly. "I can't help but worry for Martin. One way or another I think Dave Norton has his work cut out for him. I think you and I are reaching the limits of our usefulness in this, except along the lines of moral support."

"Have you told Norton yet?" Loren asked.

"No. Till we are sure, the less said the better, particularly to Martin. However, I felt you should know. I'm going to ask you to stay in the city a bit longer. My apartment is at your disposal. Edith should be back by tomorrow night. If she is right, I think Martin will need you here. You are the only real friend he has."

Loren's gaze looked vague and troubled. "I'll see what I can do."

George caught his eye and his own gaze was riveting. "You seem to be having a problem with this, Loren," he said sternly. "Obviously the prospect of Martin's being a clone bothers you."

"I don't really know," Loren said half under his breath.

"I suggest you make up your mind on the subject—and soon. You are no good at all if you have doubts."

Loren turned away and frowned at the window. "I can't expect you to understand what it is like to be told one of your

closest friends isn't exactly human."

"Is that how it is?" The tightness in George's voice plainly betrayed his anger.

"Intellectually, no..." Loren said. "Emotionally... I have to think about this, George." He looked back to the man at the desk and stood up. "No one's perfect. I have my flaws like everyone else, but I'm not cruel. I won't see Martin again till I have this resolved." He turned to go but stopped in the doorway at the sound of his name.

"If I may suggest," George said earnestly, "you might try dwelling on what you just said. Here are the keys to my apartment." He gave the keyring on his desk a toss. "I'll call you if I hear from Edith."

Loren nodded and left in silence. He walked the dozen blocks uptown to George's apartment but didn't stop. Instead he turned crosstown and continued on to the park. He kept telling himself he was a rational, intelligent adult. He had nothing against clones, so why did he feel the need to keep asking how Martin could be one? What was wrong with being a clone? Nothing, except...well, they weren't really human...exactly...were they? But why not, damn it. Because...because.

Loren found himself thinking of glass jars full of murky womb environments—nutrient fluids laced with tubes and hoses and filled with clumps of fetuses like clusters of grapes. Of row upon row of identical organic mannequins, tagged and labeled and mindless, waiting to be uncorked from their bottles and turned loose to play at being people. Marching through the park, rank and file, speaking as one, seeing as one, thinking as one, moving like a huge school of humanoid fish.

He knew it didn't work that way but he didn't know how it *did* work. Nor, more importantly, why. He suspected *no* one knew why. Any more than anyone knew the basic *why* of life itself. We knew how to tamper with it, destroy it, shape it, alter it, prolong it, multiply it, but we could not create it. Not really. Not without a form, a substance within which the spark already glowed. Having reduced all of life to that level, Loren walked the park with pocketed hands and bowed head and came to a decision.



WHEN HE REACHED George Willis's apartment, it was full dark and the phone was ringing. Edith was back. She would meet them at George's office in half an hour. It was not necessary, but Loren took a cab.

George did not ask Loren what he had decided. He would wait till they heard from Edith. They both paced and sat and said very little. Finally, Edith called from her own office and they went downstairs to hear the verdict.

"One word," George said from the doorway, "that's all I want right now."

Edith watched them stonefaced, elbows on the desk, fingertips braced against each other. She spoke through the narrow arch between her hands.

"Yes."

George nodded slowly.

Loren was expressionless.

"He is a clone," she said sitting back.

"Are you *sure*?" Loren asked, finding a chair.

"Totally," Edith said. "Actually it was an appallingly easy piece of information to track down. One would think it would have been better covered. But then I suppose you only hide that which is looked for, and no one else has looked."

"How do you lose a clone?" George asked.

She shrugged. "He wasn't really lost, at least not at first. Hidden, actually. The Coreys never legally adopted Martin, which is probably why they never told him he was not theirs by nature's grace nor anybody else's."

"How do you know he wasn't theirs?" George asked, still standing, arms folded, looking reasonable and skeptical.

"I saw the others," Edith said. "Not in the flesh, unfortunately, but the photographs were quite good enough. I also know where they are, so a positive identification can be made as early as tomorrow."

"They are in the city then," George said.

She nodded.

"I still don't understand," Loren said.

"I spoke to a man named Robert Lewis in Washington, He and I both worked on the Downing Project. We have maintained a degree of professional contact ever since. Bob went on to become a specialist in several aspects of genetic engineering and has stayed with different phases of the project all these years. I won't go into the level of development achieved by the project team at the time Bob and I were involved. Suffice it to say it had produced results of a type I was able to relate to Martin, once I could recall where the information had originally come to my attention.

"More to the point, Bob was able to tell me a considerable amount about Martin. He was cloned from a man named Joseph Penn. He is of no particular importance to most of this but I have his file just in case. He is no longer with us, by the way. At any rate, Martin was originally part of an eight-clone—"

George whistled softly. "That's a great deal of 'noise' to have to deal with unprepared."

"Apparently so," Edith said. "And he has had no experience of any value as an integrated member of that special clone relationship. He was only a few days old when he was separated.

"Milton Thatcher was directing the Penn Project at the outset. I knew of him but Bob knew him well. He was a brilliant man; highly respected by everyone in the field for the breakthroughs his work had produced, but eccentric in many ways and, on a personal level, a pain in the ass to work with. Projects were *his*—simply that. He was an autocrat and extremely jealous of his place in the scheme of things. To his way of thinking, as long as he kept to his budget and made periodic reports, what he did within the framework of the project was no one's business. Unfortunately, his budget was a wreck and his reports were nearly nonexistent. To people on the inside—Bob, his senior assistant, for one—his obsessive secrecy smacked of paranoia. There were things even he and the other staff members did not know. In fact, it was several weeks before anyone realized one of the infants was missing. Thatcher had broken up the team responsibilities so thoroughly no one but he was in contact with the entire clone at any given time. A headcount was never considered. They weren't even fed and tended by the same nurses. But it was the budget that finally did him in. The chairman of the CRDP ordered an unannounced inspection of the Penn Project but what they found was hardly what they expected, though I'm sure they found much of that, too."

"More like what they didn't find," George muttered.

"Precisely," Edith said crisply. "George, sit down, you're making me tired. It's been a long day."

George dragged up a chair.

"But why?" Loren said, bewildered. "What earthly reason could anyone have for giving away a clone?"

"To produce the very situation we have before us now. Though left in Thatcher's hands, hopefully, it would have been better controlled. Apparently he wanted to test the Link, to see how separation would affect the individual, the group as a whole, and eventually how reintegration might be achieved. At the time virtually nothing was known about the Link. The oldest surviving clone-group was a twelve-year-old four. Thatcher wanted a controlled situation for long term study. Not a bad aim if you discount the possible tampering with the sanity of one to eight minds and the means he employed. Maybe he knew what he was about, I don't know, and neither does anyone else. When he was found out his only reaction was to tell the CRDP to butt out. He refused to accept the fact that the last word was not his. He also refused to tell anyone what he had done with the infant.

"He was, of course, removed from the project. The department was considering having him arrested. He got wind of it, packed up his clothes and notes in a rush and took off. His paranoia must have been acute by then. Apparently he fled as though he were being chased. The Maryland Highway Patrol clocked him at 130 kph going north. They chased him for real. Unfortunately, he and his car developed an intimate relationship with a bridge abutment and he barely got 80 kilometers from home."

"He died, of course," George said.

"If he hadn't, we wouldn't be worrying about this. His notebooks were recovered. That told some of the why, but not the where or who."

"Didn't they try to find him?" Loren asked.

"Not very hard. Funding was delicate then. The Cloning Research, Development and Planning Project as a whole could have been wrecked by the publicity. Mad scientists and what-not make great material for newspapers and nightmares. It was easier and safer for the CRDP to keep its mouth shut, fudge the records, and turn the Penn clone into a seven. The wonder is that, with so many people in possession of the whole story, it never leaked beyond the walls of the CRDP."

"The Coreys, naturally, were not going to stick their necks out. Thatcher was gone, they may or may not have known of his death, and who knew what legal nightmares might follow upon confession of complicity. Better to shut up and move to Indiana."

"Besides," Edith said in a softer tone, "I think they really cared for the kid. Or at least they came to. He's well adjusted enough—considering..."

George looked at Loren whose eyes seemed to be trying to bore a hole in the floor.

"Now that the problem is out in the open, how are we going to deal with it?" Edith said. No answer. She watched George watching Loren and began to wonder what she had missed on the home front. "For efficiency's sake I suggest we do some division of labor," she said carefully. "The Penn clone, Dave Norton, and Martin all have to be talked to."

"I'll talk to Martin," Loren said quickly, looking up.

"Are you sure?" George said.

Loren smiled and nodded. "I think he'd take it better from me than anyone else."

George studied him silently for a moment.

"I'm sure, George."

"Am I missing something?" Edith asked.

"Later," George said, sitting back looking relieved. "I'll talk to Dave. I think, since you have the story in the greatest detail, you should talk to the Penns, Edith."

"I agree. Bob Lewis had certain mixed feeling about Martin's resurfacing. A lot of people are going to have their ethics turned inside out, but he's a good man. He cares about his people and his work and his greatest concern has been how this will affect the existing clone-group. It's a delicate matter on all fronts. He spent 18 years on that project. He knows them better than almost anyone. He asked me to let him make the initial call tonight. Unless something unforeseen arises they will be expecting me at 10:00 tomorrow morning."

"Well, I'm going to talk to Dave Norton tonight," George said. "I'd like him to be available and aware when Loren sees Martin."

Edith pushed a stack of files across her desk. "Give him these, they may be helpful. Would you care to look through them first, Loren?"

Loren shook his head and stood up. "No, thanks. I don't think they would help much with what I have to do. He's my friend and I think he will need that more than anything when the time comes. Right now I have a lot of thinking to do."

"He isn't dying you know," Edith said, a slow smile on her face. "He has a potentially fascinating life ahead of him. Cheer up. Do your friend some good."

Loren could not recall ever having seen Edith in any mode but dead serious. She was serious now, but she had a fine smile and it was infectious.

"OK," Loren grinned, too.

"I'm not trying to soft pedal the potential problems," she said, "but as far as I can see he was a lot worse off this morning when we didn't know anything."

She stood up abruptly, her hands clapping a sharp report. "So! Are we ready to man our stations? Come, gentlemen, we have work to do!"

EDITH'S PEP TALK was surprisingly effective but Loren's night dragged long nonetheless. He returned to the apartment while George stayed at his office and eventually dragged Dave Norton out of bed. Loren thought up a dozen speeches and killed them all. He knew what had to be said, but the how was driving him crazy. Norton gave him a few hints at breakfast, but in the end it was Martin who made it easy. He had second-guessed Loren's direction half way through the preamble but seemed barely to react. He had laughed a little with that hollow sound his voice had acquired lately and said it was at least good to know he wasn't crazy.

Loren could not tell how Martin felt, nor could Dave Norton when they talked later. Sometimes, he thought, being a friend wasn't worth much.

By noon Edith was not back from the Penn meeting, Norton had seen Martin, and Loren was back at George's apartment trying to make up for the night before. George had promised to call when there was a chance for them to talk to Edith, but she cloistered herself with Norton first and George did not call till 3:30. Loren shaved, showered, and tried to make himself look more alert than he felt.

Loren stepped out of the elevator and walked quickly down the hall to where George stood talking to Martin. He hadn't expected Martin to be in on this. But Loren had to admit he looked better. He'd had a haircut and wore a conservative, but exceptionally well-tailored, three-piece suit. It looked rather more expensive than Loren would have expected but he hadn't really seen Martin's wardrobe since Chicago. The nearer he got, the better Martin looked, damn good in fact.

Too good.

The face that turned toward his approach was not as lean, the look was placid and thoroughly self-possessed, and the eyes did not show the slightest spark of recognition. But when he smiled it was Martin's smile and he spoke with Martin's voice. The handshake was firm and brisk.

"Dr. Johnson," he said, smiling, "I am Julian Penn."

"Hell," Loren said. He felt himself staring.

George stood beside the young man, hands pocketed, unreadable.

"Mr. Penn is here to see Martin," he said. "I'm afraid I don't think it is a good idea. He isn't ready yet."

"I hate to disagree," Julian said, "but I think he is overdue. He has been told, has he not?"

"Yes," Loren said. "He knows, but he doesn't want to."

"All the more reason. Dr. Willis..." he looked at George and grinned, "...the other Dr. Willis, said she would speak to Dr. Norton about it. If he has no specific objections she had none."

"I haven't seen Edith yet," George said. "But I can't say I agree. I think Martin could use some counseling before we enter into any real contact."

"Until he feels comfortable with what flows through our Link there is little of a constructive nature which can be done. We are the only ones who can help him with the Link Effect, no matter how good Dr. Norton may be."

George was silently studying the tips of his shoes.

Loren silently studied the clone, the man who was and was not Martin, who was human but somehow not exactly. Not less than but other than? The handsome, auburn-haired, serious-faced young man with a touch of amused tolerance in his eyes; for suddenly Loren realized Julian Penn knew what he was thinking. He didn't need telepathy or the Link to know, because he had lived with this all his life. He knew what it looked like on a man's face and Loren realized that all his flags were out and Julian had spotted every one. Who could know better how Martin was to survive?

"Let's be realistic, gentlemen," Julian was saying with Martin's voice, "any course we take is a venture into the unknown. No one really understands what is best for my brother, including me, but the seven of us have discussed it and we all agree it is something which must be done and the sooner the better."

My brother, Loren thought.

"I don't know if he could handle the pressure," George said.

"He should be experiencing a degree of relief," Julian said. "We decided he deserved some breathing room, so my brothers took the 1:00 shuttle to Washington. We want to do all we can to help him—and ourselves as well. As for the pressure of having me in the same room, believe me it is far easier to cope with the Link when confronting it directly. He can relate much of what he feels to what he sees."

"Perhaps," George said. He studied Julian for a moment more. The young man was sincere and exuded a confidence which not only made one want to trust him, but was the exact measure of what Martin lacked.

"I vote yes," Loren said.

"I'll call Edith," George said. "She and Norton can bring him—"

"I would like to see him alone."

"Unprepared?"

"Before he has a chance to frighten himself beyond reason."

George turned toward his office. "Come in while I call."

"Thank you," Julian said. "Believe me, I know how he feels."

MARTIN SAT ON EDITH WILLIS'S BOOKCASE by the window watching the construction across the street, arranging the pencils in her holder, waiting. He felt uneasy but it was different. The persistent feeling of presence had grown dimmer and yet not really. It was strong now but it had changed. Was it because of what Loren had told him? Could simply knowing make such a difference?

He remembered Loren's face as he spoke; trying to be objective, professional, yet not wanting to be less than a friend. Loren had probably practiced that five minutes endlessly before he could finally deliver it, and Martin had sat there expressionless and let the words wash over him. They had no meaning, offered no relief. They had nothing to do with him. All he could do was save Loren a little. Now, though, as the intensities began to shift he could not deny that it was true—only it didn't help and he resented having to know.

Something stirred him and he looked up. He knew himself even before the face turned to him from the door. The man stepped closer and stopped by the desk, hands clasped behind him as Martin so often did. He could feel the left hand gripping the right across the back, fingers over the palm, and he looked down at his own hand which still held the pencils.

"I'm Julian Penn," the man said softly.

Martin turned back to the window. His resentment was rising and he felt spiteful. "So?"

"I'm your brother."

"Is that what you call it?"

"It's what we are."

"I thought what we are is called clones." Martin's voice was a sneer.

"It is." Julian was calm and reasonable. "It's only an extreme number of identical twins."

"Freaks!" Martin snapped.

"I'm not a freak," Julian said.

"Oh yeah? Well I am, so where does that leave you?" His voice was rising as he turned from the window, "If it was only being twins I wouldn't be sitting here on the edge of a nervous breakdown!" Martin suddenly felt the truth of that as his emotions surged to the surface in a rush of anger.

"That's why I'm here," Julian said.

"To push me over the edge?"

"Why should I want to do that?"

"How the hell should I know?" Martin flung himself from the window and began to stalk the room, yelling, "Why have you been doing any of this to me? You're trying to drive me crazy—all of you!"

Julian seemed to flinch but stood still while Martin paced the room clenched-fisted and wide-eyed.

"I am a freak, even to you! I don't fit. I'm an infected appendage that has to be cut off—so you have all ganged up on my mind. You're driving me nuts! What did I ever do to you? Why can't you just leave me alone?"

As Martin ranted, the muscles along Julian's jaw tightened and his hands gripped each other hard behind his back. The desk was between them again and Martin's fists came down with a bang on the blotter. He lurched forward, toward the other self.

"Get out of my sight, get out of my life! Get the hell out of

my head! Because I won't let you get me. Did you think if I went bananas I'd kill myself and—"

"No!" Julian's face contorted and a spasm shook his body violently, his arms flung before him as if to fend off an attack. Martin sprang back as though struck. He caught his breath with a gasp as a wave of pure horror washed over him.

Julian shuddered, drew a ragged breath and whispered, "No."

Martin cast a terrified look at Julian as the feeling began to subside. It was a shock to realize that the horror had not been his own. He saw Julian standing there, arms limp, white-faced, looking desperate and vulnerable.

"It isn't a one way street," Julian said in a low voice. "It doesn't all come from us and flow to you. Do you think we could drive you crazy without going mad ourselves? Do you think what happens to you doesn't affect us?" His voice became husky and caught in his throat. "Do you think I don't feel the pain?"

Martin swallowed and felt a bit weak.

Julian sighed and ran a hand through his hair. He felt weak, too.

"I thought I was stronger than this, I didn't think I'd lose control so badly." He took a deep breath and straightened. "You don't know how to cope with the Link but that doesn't mean you don't use it. It doesn't mean you don't hurt the rest of us. You can't help it. You can't turn it off any more than I can, but you're stronger than you know. You have to learn to live with it."

Martin took a step back and sat on the bookcase and Julian came forward, sitting on the edge of the desk. Both men were calm and silent for a time while Martin tried to explore what was going on inside him. He could not sort it out.

"Julian?" Martin said at last.

"Yes?"

"Who am I?"

"You are Martin Corey."

"How can I be?" His gaze met Julian's and held it.

"How can you not? We are not like a computer with eight terminals. We are individual human beings, though more alike than any eight people nature ever created. We have a special relationship which some identical twins seem to have, but which is unexplainably more fully developed in us. It is nothing more sinister than a form of communication, an awareness of all brothers, including you, without specifics. It's just what you know, what you feel. No words. No imagery. It ties us together loosely. I am not Jesse, though I may know him as well as I know myself. Justin is not me. You are not Jason nor is Jonathan you... nor Joshua, nor Joel. You are Martin Corey for whatever that means to you. What is there to a name but what we build into it as we grow? Only you know who you are. What you have learned lately doesn't change that.

"We have only one thing to offer you, Martin. We can help you live with the Link. Not rid you of it, but integrate it... if you will let us."

"What's it like... for you?" Martin asked wearily.

"You don't really notice it if you don't think about it. Unless something extreme happens." He grinned. "We have been noticing you a lot lately. But we didn't know you existed. We were never told. You put a great deal of anxiety into our lives recently and we could not find a reason for it."

"Didn't you suspect?"

"Did you?"

"How could I?"

"How could we?"

Martin felt quite calm. He realized he had felt calm the whole time Julian had been speaking. He was also aware that the feeling was entirely his own. It had nothing specifically to do with Julian, of whose mood he was somewhat more vaguely aware.

"It takes practice," Julian was saying. "but eventually it gets to be like another inner ear. It gives you a different kind of balance."

"We don't expect you to stay with us. You have your own life. We were trained for the work we do on the Project and it would be asking a great deal to expect you to reorder your life for no reason. But wherever you go or whatever you choose we will always be linked to some degree. Helping you live with that will help us all."

Martin sighed and looked out the window. He liked Julian and felt foolish admitting it. He saw it as a kind of narcissism and tried to reject it. And what about the others? He remembered the feeling of being buried and a touch of panic crept in. But Julian said they would teach him to control it and Julian did not look buried. Still, when had it not been an upsetting or at least an unsettling feeling? He felt the thin edge of fear in the up and down, back and forth swings of his thoughts.

A rational mind should be able to face its fears and deal with them, he thought. If I can't trust my own flesh and blood... Still he vacillated and was more afraid. He gritted his teeth and closed his eyes. He did not want to decide but he could not put it off forever.

Behind him, softly Julian said, "What will you do, Martin?"

He turned and sought the fear and found it in Julian's eyes. He felt something held back like a breath. Julian could not read his mind and Martin realized the man could not take the intensity of the indecision lightly. He got up and went to stand by the desk.

"I have a lot to learn and it's going to be hard. I'll probably need this shrink almost as much as I'm going to need you. At least at first," he said and smiled with Julian's smile. "Do you guys think you could find room for the best computer man Indiana University ever turned out?"

He felt the something held back let go and waited for the smile, twin to his own. But when it came there were tears in it. All Martin's own doubts, hopes, fears, and relief welled up like a tide flowing and returning across the silent path between them. But at the same time he felt stronger and more nearly whole than he had ever felt in his entire life. He was not Julian. He was Martin and though they felt the same at that moment, it was Julian who could cry and Martin who was free not to.

Julian stood up and hugged his brother hard and Martin let his love reach out and knew where it touched and what it brought back.

"Welcome home," Julian said.

—G—

Primordial Soup

Roy Lichtenstein

8 cc hydrogen
5 cc ammonia
6 cc methane
10 cc water vapor
dash of nitrogen

heaping tablespoon carbon monoxide

Mix well in blender.

Faulty connections should supply electrical sparks.

Ultraviolet light should help.

Wait for complex molecules to develop.

Pour mixture into two-quart enamel saucepan and simmer over low heat.

Soon, in geological time,
amino acids will synthesize, become protein, and begin self replications.

When two quarts have developed,
remove from heat.





THE INCREDIBLE LIVING MAN

John Kessel

STEPHEN HAD NOT BEEN THE SAME ever since he'd returned from the dead.

Martha realized this, at last, when she found him standing rigidly in front of the sideboard in the dining room, head thrust forward, peering intently into his reflection in the mirror. She stepped quietly back into the hall, hesitated, then entered once more, this time scraping her wedding ring against the doorjamb and stepping audibly on the hardwood between the dining room and hall carpets.

Stephen had his back to the mirror. He leaned against the sideboard, and the cold gray eyes watched her.

The real Stephen's eyes had been brown, quiet, like a doe's. Martha fretted—he didn't look like Stephen! He looked like that damned caretaker!

"Carl Spencer from Pelucid Press is on the vid," she said. The tall, blond man straightened and went by her to his study. His stride was the same precise, graceful one that had been her husband's. Martha felt on the edge of despair. She knew it was silly to want the body along with the mind; she had never thought that Stephen's appearance had meant so much to her. But it mattered. It was a difference, and it fell between them like death itself.

Sitting on the veranda, staring off across the estate toward the hedge that surrounded the tennis courts, she could hear Stephen through the window yelling at the vid. He had never done that before.

"Have you read that latest issue, Carl? Have you?... And you tell me Phillips knows what he's doing? It's trash, sub-literary trash disguised as the latest artistic thing!... I don't care if the man's slicker than snot on a glass doorknob, I won't have my money spent on a rag that I can't even get through, run by an old bearded adolescent bunko-artist who hasn't had an original thought in his stunted brain since 1978!... I know he's not that old, Carl; don't be a clot. And don't think you can just wait around until I fade out, fellow!... Well, find yourself another bedmate!"

There was a loud smashing sound from the study, then silence.

He's alienated another friend, she thought.

Martha was living with a GHost, and it was beginning to wear on her.

Leon Malinowski had been the caretaker of the Wheelwright estate in Linton, New York, before he had given himself up to become another man's body. He was some years coming to that point in his haphazard life.

Tall, fair, with a face too angular to be considered handsome, he sat in a comfortable room being interviewed for the computers of Northeastern Life Extension, Incorporated. The paneled walls might have passed for dark walnut. Recorders and cameras were invisible. The light from the floating globe in the corner was warm amber. The fragrance drifting on the air, so faint as to be subliminal, was of fresh pines. Yet Leon was not at ease.

A cleanly functional young man sat in the chair opposite him. They did not use machines to interview, even though the job could be done more quickly and efficiently that way. There were enough people to go around, in the first years of the new Libertarian Age. Let the people work—they enjoy it; it gives them a sense of value. And strangely, the use of human beings can, in the end, save more money than using machines. People respond better to people. "Our technology must wear a human face," the Senex had said. Quite true.

And here they were.

"What made you decide to become a host?" the young man asked. He looked as if he were about to smile.

"The money," Leon lied.

"Ah, yes. It is a lot of money, isn't it?"

"It is." Leon tried to look earnest, forthright—to create the right image. Christ knew he'd never had much luck at that, in forty-two years of trying.

"Aren't you a little worried about what might happen to you while you're under? You won't have any control, and you'll remember little of what happens while the viral personality is running things. I have to tell you, there have been some unfortunate accidents to the hosts while under the influence." The man crossed his hands in his lap. He still seemed about to smile. "You see, some of the extended personalities, being already dead, so to speak, have little sense of responsibility."

No responsibility. No memory. No control—*exactly*.

"Of course," the young man continued, "Northeastern accepts no responsibility for such accidents."

Leon tugged at the corner of his mustache. "I

understand."

He understood nothing. That was why he was ready to leap into this doubtful ocean—he would blot it *all* out—and perhaps, if there was any God or justice left in the dry world, he would resurface in some finer place. To try again.

"Actually, I'm curious about the whole experience. I wonder what it feels like, coming back to yourself after being someone else for two months."

The best lie is a distorted truth.

"Two months is a statistical average. Fifty-nine days, mean. Here at Northeastern, our maximum ever is seventy-eight; minimum twenty-six. We had to go to court on that last one—the next-of-kin complained."

Leon decided that the incipient smile was part of the man's repertoire. Trying to make you forget you're being psychologically analyzed. Or maybe he was testing responses. Or maybe he'd been surgically altered as a child. Leon felt a little sick.

"I guess I can see their point. They're spending a fortune to have someone live on, right? They want their money's worth." Their pound of flesh.

"So do we all, Leon. Can I ask you what you do for a living?"

They knew it already, but even in his sick despair, Leon had expected they'd ask him again. His career. His game of musical chairs. His private obstacle course.

"Most recently, I've been the caretaker on an estate in Linton, New York. The details are all in the matrix I submitted: I ran the physical side of the place for the last four years. Kind of a general handyman, purchaser, jack of all trades. I'm pretty good with electronics, as well—one of the last of the non-specialists."

"Yes. I get you." The man leaned back, crossed his arms, crossed his legs. He acted as if he expected Leon to go on.

"Before that, I worked for North American Telecommunications, doing construction on lease to various projects, nothing special, and before that—"

"You attended university, didn't you?"

Leon closed his eyes, then opened them quickly. Had the cameras seen that? University. What the hell difference did it make? "Yes," he replied. "I went to Amherst, graduated in 1991."

"That was a good school, wasn't it? Your degree was in history, right? Didn't you feel like going on?"

The guy had to be trying to get to him; Leon refused to be gotten.

"Not much career in that, especially back then. That was twenty years ago, before the revolution. And to tell you the truth, I wasn't very good at it."

The young man touched two switches in the arm of his chair. Two tiny lights went on beside them. One was red, the other green. "Now a little more serious matter: are you married, or under emotional contract to anyone at the present time?"

Another expected question, the one he didn't want to answer, the one he'd steeled himself to get through. He wondered how Caroline was doing at that school, even whether she was still there. He'd managed to keep from hanging around her while he had the Wheelwright job, but when he felt sick—when he felt the way he did now—he needed her. What a basis for a relationship that had been.

The silence lengthened. The young man finally broke it.

"The reason I ask, Mr. Malinowski, is that occasionally—very occasionally—a friend of the reborn person who is using

the host's body, will develop an attachment for the host. When the host's memory and personality return, he faces the embarrassing prospect of having a total stranger feel an attachment to him. You wouldn't want to wake up to find some strange woman in love with you—so we prefer that our hosts be independent individuals."

That was a joke. "I doubt that will happen to me."

"One can never tell."

"I was married for six years," Leon said dully. "It didn't work out."

"Yes."

"Would you like a sexual play-by-play? Or maybe we could act it out right here, Mr. . . ."

"Mr. Smith." The man finally smiled. "That's really my name."

"We've all got our burdens to bear."

Mr. Smith laughed. "You can say that again, Leon." He seemed to have come down off his official horse. "You have a nice sense of humor. I like a man who tells me what he's thinking." He stood up.

"Northeast usually prefers men a little younger than you, but you seem to be in good health. Come down with me to our clinic and I'll have our Dr. Trent push you through the circuit."

They left the nice little room and went down a white corridor to a dropshaft. Down the rabbit hole to our Dr. Trent.

And amazingly, Leon had not had to bare his soul. The directors of Northeastern Life Extensions were about to make a mistake.

Death, physical death, is inevitable. We do not know about such things as survival of the spirit; frankly, we do not care. There are, however, certain things we can do—physiological stopgaps, if you will—to preserve the personality after the death of the body. So far the only feasible, commercially viable method, is the gamma-host method. GHost, for short.

The person whose personality is to be preserved (by State Act 6771-4EB, he must be "in a condition of physiological and neurological death") has his personality and memory analyzed by the bio/computer techniques developed by Stenslov at the Danish Neurological Institute. Using gamma ray holography and micro-surgery, a virus is prepared containing properly coded memory RNA. A host human is selected (by State Act 6772-4EB, a volunteer of the same sex as the patient) and, following the death of the patient, is injected with the virus. The artificial personality-virus acts upon the nerve cells of the host's cerebrum, causing replication of the coded RNA. In effect, the host becomes "ill," with a disease which superposes the memory and personality of the patient over his own. Until the natural defenses of the host's body throw off this alien microbe—a process which typically takes between four and twelve weeks—the host *becomes* the patient.

In practice, the process is almost prohibitively expensive. This is salvation (pallid, fleeting salvation) for the rich only. And of the rich, only a few consider this a worthwhile expense. But who will sneer at two months of life? Two months free of responsibility? Two months?

A standard remuneration of 50,000 new dollars is recorded in a private credit system in the name of the host—to be disbursed only upon his return to competence.

It has been determined (*Steinmetz v. Steinmetz*, 2002) that a GHost is, for the duration of the viral infection, legally that person whose personality was imprinted by the contracting organization upon the host human.

This is salvation—pallid, fleeting salvation—for the rich only. But who will sneer at two months of life? Two months free of responsibility? Two months?

WHAT A SHOCK IT HAD BEEN to Martha, sitting in the reception room of Northeastern, waiting for the tests to be completed after Stephen's personality transfer—when through the door had come Leon Malinowski.

Pale, slavic, the wispy blond mustache, the cool gray eyes—she had been completely taken aback. What was *he* doing there?

Unbidden, the memory of an incident that had occurred the previous summer had leapt, through her fear, into her mind. Leon had been putting new shingles on the roof of the guest house, down by the lake. He'd been at it a week; the weather was hot and muggy, and the man had been sweating away in silence over the job, the sound of his hammer ringing over the grounds throughout the previous four days. Martha had stopped by at least once a day, bringing a couple of cold beers—Stephen insisted she always be considerate of employees. Martha had been puzzled by Leon's refusal to work without a shirt, even though, in the heat, he'd sweated clear through the cotton denim. Perhaps he feared a sunburn.

On that fourth day he was just beginning the south side of the roof when Martha dropped by. Standing halfway up the ladder, a pack of shingles over his shoulder, he'd stopped suddenly and stared at the tarpaper of the stripped roof. Then, breaking his habitual silence, he'd cursed very loudly and had violently thrown the heavy bundle to the ground, overbalancing himself so that he almost fell off the ladder. He'd stood silently for a moment, breathing heavily, then climbed slowly down.

"What's wrong?" Martha had asked.

"Made a mistake." That was all he would say.

The sudden anger bursting through, and the immediacy of his repression of it, had stuck with her. She thought she saw the same emotion, fleetingly, as the GHost walked into the room to meet her.

Despite her protests they had certified that it was Stephen. And so she had discovered that it was, once she had time alone with him and felt his small kindnesses, saw the mannerisms that were Stephen's, talked over the memories that could only be theirs. But the aftereffects of that first shock, cold eyes and pale face, lingered.

Martha rose from her chair, walked over to the old-fashioned french windows and opened them to the veranda. Such an old house! It had cost Stephen a fortune to modernize it, and still it was quaint. She went out into the sunlight and looked down the rolling green slope to the lake. Autumn was coming on, and the maples that hid the caretaker's house were going orange. But the temperature was in the seventies, and out across the lake she could see some sails still testing the cold October waters. In the far distance lay the hazy, worn-down Vermont mountains. Stephen complained about the house being out in the middle of nowhere—Stephen, more at home in an underground city than in the fresh air. She knew he was only teasing her, since she'd liked Linton from the first

time he'd brought her here, well before they'd decided to contract—back before they knew it was anything more than a good time.

That was what Stephen wanted to have again. It had been his idea to go to a GHost company—it would be their chance to have those first months over again. They'd been cheated of the years they would have had. Was it so wrong to want at least a month? He was only thirty-four!

Martha, at first skeptical, had given in. Silently. The surrender had held a kind of crazy joy, but it had been a disaster from the moment Stephen had walked through that door—as Leon. She wished he would die for good, so she could have that man put out of the house.

"Martha?" The voice startled her, and she jerked around, as if he had caught her with another man. As if he'd read her thoughts.

The GHost stood in the doorway, squinting against the sunlight.

"What's wrong?" he asked. "Tell me."

"Nothing. I'm just tired, I guess. I was wondering how the work was going back at the department. Sometimes I miss teaching."

He stayed in the doorway, hand on the frame, as if to support himself. "As if those overgrown children missed you. Don't worry. You won't have anything to keep you next semester."

She felt her face flush, but checked herself. What right did he have to act so jealously? "I'm sorry, Stephen; you know I didn't mean it that way."

"Don't be silly—I don't know what you're talking about. Look, I only wanted to ask if you want to go sailing. We won't get another day like this—and what's the use of it all"—his nod included the grounds, the houses, his money, and her—"if we don't do what we like?"

It was a tone she'd missed from his for a long time. But sailing!—what a fiasco that had always been. She tried to look through the caretaker's body to the man inside; she succeeded only in looking past it. Was he afraid, in these last days, that he'd fade away and have nothing to show for his time?

"Let's go," she said.

Out on the lake the breeze was stiff, and they glided freely along, bow steady, wake clean. Stephen took the tiller of the small boat and she managed the lines. For the first hour there was no sound but the snap of canvas, the squeak of their deck shoes on the wood, the slap of water on the hull, the rush of the wind. Side by side, they leaned outboard when the wind picked up, and the only words they exchanged were short, telegraphic instructions.

"We'll tack now."

"Watch the boom!"

"It's smoother round the point."

"Pull! Pull hard!"

Later, when she was thinking of asking if they might go in,

Stephen spoke up. "This is more like it, isn't it?"

He was right, as far as he went. They'd been together the whole afternoon, unselfconscious. The pall of his death didn't hang over them, and she had almost forgotten about Malinowski.

Stephen slouched back, the tiller crooked under his left arm. His blond hair was blown about; she saw it was thinning.

"Here's a story I bet I've never told you," he said. "It's about a woman my mother knew when I was a boy; they were on some community improvement committee together, or something like that. Call her Mrs. Finch.

"Mrs. Finch was a disagreeable woman; my father used to curse her out regularly. She was a busybody. She'd been raised a strict Baptist, but was a professed atheist. She professed loudly." Stephen smiled.

"She must have been in her forties—this was when I was no more than fifteen—when she converted to Catholicism. She was the kind of woman who made changes like that—drastic, throwing herself into them—and who never let you forget that she'd turned over a new leaf. Her Catholicism, my father said, was like a new facial—and went just about that deep. Everyone knew she was just a big hypocrite, not one iota different from the woman she'd been before.

"Now, this is the part that's interesting: her son at that time—adopted, I think—was twenty or so, and he had become a worker on the first Lagrange colony, which was building back then, just before the government began to get shaky. Call him Charles. Well, Charles was in an accident up there, and it left him with total brain damage, only his body functioning. They brought him down to earth, and it was up to Mrs. Finch to decide what to do. She did a surprising thing. She insisted that he be kept alive despite the fact he was doing no good for anyone, especially her."

Martha didn't understand. "That was the right thing to do, for a good Catholic."

Stephen nodded. "That's just the point—was she a good Catholic? Why did she do the Catholic thing? Because everyone expected her not to? Or because she believed it was right?"

Martha didn't answer, though he looked like he wanted her to say something. She wasn't a mind reader.

"We're none of us mind readers, are we?" he said, eerily. "So we just don't know."

He shifted in his place, called for another tack. The boom swung round and they headed upwind toward the slip. Martha leaned outboard to balance the boat, and Stephen threw the hard, strange body against the pitch of the deck. For a moment he moved as if he'd grown up in that body.

"What happened to her?" she asked.

"Mrs. Finch?"

"Of course!"

He moved up to help her reef the sail. "She doesn't exist," he said. "I just made her up."

She wanted to laugh at that; something stopped her.

"It's a good day," he said. "Maybe the best yet." He turned and smiled at her. "Maybe the best day ever!"

Martha tried to smile back.

As they pulled up on their private dock, she saw him shiver once, convulsively, as though a severe chill had come over him. The cold wind had not affected him on the lake.

"That Leon may be a schmuck," Stephen said, laughing, "but at least the son of a bitch keeps it."

He laughed again, and now it was Martha's turn to shiver.

A NEW RECORD had been established for Northeastern: ninety days, and still Stephen seemed to be with them.

Martha tried not to show it, but she was higher than a damned kite most of the time, trying to stay calm. Was the way he picked up that knife the way Stephen would do so? Was he eating more? Were his sentences structured the same? When had he last called Tom Mitchell—his best friend? When did he start reading detective novels?

When had he ever expressed a sympathy for the voluntarily unemployed?

On the evening of the ninety-second day, they made love. They had been insane to think they could fool themselves into thinking it was the way it had been before—but now, with her doubt growing like a subtle cancer, there was absolutely no illusion of contact. She was in bed with a stranger.

"Is something wrong?" he asked her, as they lay there in the cool dark.

Martha could just see the silhouette of his face against the curtains, whitely illuminated by the moon. He sounded so much like he cared for her. But couldn't Malinowski care for her, in his own way? Couldn't it be Leon who wanted her now, out of the depths of his silence, speaking through this most bizarre of disguises? She had known no more about him than what she thought she had read in his eyes. He was a closed man.

"No answer?" he said, touching her arm, turning so his face was all in shadow. "You know why the quality of sex has been declining in the West for the last sixty years? You're a good example. You think too much."

"Stephen, what the hell are you talking about?"

"You're pitiful, Martha. Sex with you is like taking a multiple choice exam. Your head's full of questions, and I'm trying to guess the right answers. Well, I'm tired of guessing."

She turned over, furious, shaking with fear and anger, and faced the wall. *Don't touch me*, she thought. Sweet Jesus, *don't touch me!*

Stephen was dead. She knew that now, panic clutching her throat. All that was left was Leon, trying to steal what he knew he could never earn for himself. He was insane.

"I don't care anymore," the stranger's voice said behind her. "I've lived longer now than I ought to already. I still remember who I am. I still know who you are. What does their science tell you about me—nothing! Maybe I'll live forever. Maybe we'll never see Leon Malinowski again."

Martha closed her eyes so tightly there were tears in them. Stephen got out of bed and walked to the door of his own room.

"Good night," he said.

She lay there in the dark, trying to collect herself. Ten minutes saw her thoughts gradually cease whirling. He was only a man; there were ways to deal with him. She got up, put on her robe and slippers, and went into his room. He wasn't there. His curtains were drawn, and in the distance she saw the lake glitter in strong moonlight. Halfway down the slope, through the now-barren trees, a light shone in the house that had been Malinowski's.

She drew on a coat, went quietly out onto the porch, then down the back stairs to the lawn. The grass was coated with frost; her feet were cold and her breath steamed in the night air. As she drew closer to the caretaker's house, she could feel the storm building inside her.

Martha came up the back steps two at a time, making

On the evening of the ninety-second day, they made love. They had been insane to think they could fool themselves into thinking it was the way it had been before.

enough noise so that she was sure he would hear her. The place was still full of the things Malinowski had left behind when he had so hastily quit—his hunting rifles, his old-fashioned television, a couple of toolboxes, stacks of old magazines, a tri-D of his wife. She found him in the living room of the small house. He sat in an armchair, in bluejeans and workshirt, and read one of the caretaker's books.

"What's the matter?" he asked, with a hard edge to his voice. "It must be two o'clock. Couldn't you sleep?"

She stood in the archway, her fingernails biting into the palms of her hands, at her sides.

"What are you doing here?" she demanded.

He closed the book and put it on the table beside him. "I've been curious about Leon's books. I wondered what detective stories he had—whether he had any old ones. That's all."

She continued to stare at him.

"It's all over now, Leon," she said. The words were like rocks thrown through plate glass. She threw some more. "You were a fool to think you could carry this off! I was a fool to let it go on so long! There's no more of Stephen left in you than there is in—in his corpse! I want you out of here! I can't stand you!"

The man in the chair pulled nervously at his mustache with his thumb and index finger. He lifted his chin and stared right at her as he spoke. That was Stephen's gesture.

"So that's it. I've never really realized just how shallow a woman you are, Martha. You've destroyed these last three months with your suspicion. You can't see through this damned body I'm wearing to what I am inside—"

She was not about to be put off. "I see what you are, damn you! Leon Wheelwright Malinowski. A failure all your pitiful life, and a failure again." She felt a savage joy, and at the same time was startled by her own vehemence. She would rip him open and expose the fraud in his guts.

"Shut up!" he shouted, up out of the chair so quickly it was like a spasm. His arm jerked as if he wanted to hit her.

"What do you understand, Martha? I'm a dead man! I'm stuck into this man's body, half of me left behind, and you expect me to be the same! How do you know, if I had stayed the same precious Stephen you think you loved, that I wouldn't change anyway? People do change, you know, even when they're alive. I know who I am. Who are you to tell me—just what have you given me, besides your suspicion, for three months?"

Amazingly, he was on the verge of tears. Some men had learned that old device.

"Have a good cry, Leon! On the house. One for the road."

The man looked suddenly old. Forty-two, going on sixty. Something seemed to give way in him, and he sank to the chair. Silent now, he rubbed his forehead with the fingers of his left hand, and stared at the floor.

"You've said your piece. Now go away."

She could not help feeling a twinge of conscience as she left him there and went back to the house.

The hearing to determine the true identity of Stephen Henry Wheelwright/Leon Wenceslaus Malinowski, held behind the closed doors of the First District Court of the Middle Atlantic Free State, became a center of public attention before even the date of the proceedings had been set. Martha Prouse refused to comment, and her lawyer, Dorothy Simpson, tried to keep the press off her back. Northeastern Life Extensions said only that the court's decision on the propriety of the injunction they and Ms. Prouse had brought, would determine whether Northeastern need be embroiled in any further suit.

Northeastern hoped for a speedy resolution of the problem. The state, in the final analysis, hoped for just as speedy a solution. A legal morass lay before them.

The scientific testimony was surprisingly useless. Never in any previous gamma-host infection had the host personality failed to re-assert itself within twelve weeks after completed personality transfer. The normal process for determining the success of the GHosting was to administer a battery of pre- and post-infection tests of memory over specified materials. But the tests on the current Wheelwright (who freely volunteered) were inconclusive. The explanation: if you were to test the memories of anyone over a three-month period, you would in fact receive a variety of results. The loss of a GHost personality was a gradual process, though it advanced exponentially at the end. A properly prepared host might school himself to remember any number of things, especially if he, like Malinowski, was familiar with with client before the infection.

Northeastern apologized for the oversight that had allowed Stephen's personality to be implanted in a man with whom he had previously been associated.

Stephen's lawyers produced Dr. Pieter Stenslov, who had performed experiments which suggested that, given a peculiar failure of the host's immune systems, permanent RNA transfer might occur.

The media had several field days. Wheelwright was quoted asserting his "innocence". Long retrospectives on his career, his involvement at age 28 in the Libertarian Constitutional Convention of 2005, on the sources of his wealth, on his marriage to Martha Prouse, Ph.D. in sociology—all cluttered the airwaves. Malinowski's career was also probed. His ex-wife, now a computer economy engineer at the Friedman School of Social Contract Design, provided good copy:

"Leon is a superior liar. He fooled me for six whole years. Sometimes I think he even fools himself."

She was asked whether she might bring suit against Northeastern if Leon's personality had been permanently superseded by Wheelwright's. She replied that she was sure Leon would be back, that, "He's always there, asking for money, when you least expect him."

Shortly after this interview, she was advised to remain silent until the issue had been decided.

Given the ambiguity of the scientific evidence, Martha's

counsel maintained that the only test of Stephen's identity was to compare it against the memories of those who knew him best. Dorothy Simpson submitted affidavits by fifteen of Stephen's close associates, including his best friend, Thomas Mitchell of Albany, asserting that the said GHost was not the Stephen Wheelwright they knew.

Stephen's lawyers submitted six affidavits in rebuttal.

"PROUSE SCORES, 15-6," announced the papers. The affidavits were compared by commentators and other experts.

On the morning of the final day of the hearing, the *Boston Electron* printed tri-Ds of Martha Prouse, the darkly handsome Stephen Wheelwright, and Leon Malinowski on its front page, underneath the banner headline:

"WHO'S ROBBING WHO?"

A tri-vid recording of Stephen Wheelwright's statement to the court:

Wheelwright/Malinowski has his large hands, crossed, before him on the table. To his right is the shoulder of his lawyer, cut off by the edge of the tri-vid tank. His composure looks artificial, the result of an act of will. He speaks:

"There is no doubt in my mind that I am Stephen Henry Wheelwright. I am possessed of his memories and reactions, and I am aware of his opinions. Let me repeat: *I am aware of his opinions.* I do not hold all of them, just as you no doubt do not hold all the opinions you once did. I have undergone a strange experience, one that none of you can really understand. I have found myself coming to life in another man's body. He was not a man I can say that I liked, or even understood—in fact, I had never tried to understand him. Is it any wonder then, having to accustom myself to his shell, that I sought to know him better? Is it any wonder that, thinking I had only weeks of existence left to me, I acted differently toward my wife and friends? I will admit to the world, readily, that I am not the man I was when I died.

"But I insist: I am Stephen Henry Wheelwright. What authority has this court to tell me otherwise?"

"His lawyers made a big mistake, letting him talk," Dorothy said.

They sat in the comfortable little room adjoining the courtroom. Martha smoked a marijuana cigarette and waited for the court's decision, as she had waited once before—how long ago it seemed!—for Stephen to walk through the door of Northeastern Life. Dorothy sat beside her and talked to her, but Martha heard nothing of that; it was like the washing of the feeble waves upon the beach at Linton.

The man's statement rang in her mind. What did it mean? She sought vainly for some key that would enable her to see through it to the truth, the way you might wipe away the frost from a window and see clearly, at last, the winter outside. But the doubt hung round her. Did Malinowski have that much gall? Did he know what he was saying? Or was it somehow—despite the evidence of every instinct she had learned to trust—the truth?

We're none of us mind readers, are we?

She closed her eyes at the memory, took a long pull on the joint, and lay back in her chair.

"How long is she going to take?" she asked Dorothy.

Before the lawyer could answer, the door slid aside and the court steward asked them to come in.

The others were standing when they walked in, but for some reason, Stephen/Leon refused to rise, and his lawyer

stood beside him with a look of exasperation on his face.

Martha's heart was racing faster than it had any right to; she reached beside her to hold Dorothy's hand. Dorothy shot her a quick glance. Martha watched Stephen, sitting very still, his hands clasped in his lap.

The judge strode in, glared for a moment at Stephen, and sat down at the bench. Without preamble, she began to speak.

"The court upholds the injunction of Martha Elizabeth Prouse against Stephen Henry Wheelwright. We declare Stephen Henry Wheelwright legally dead, and advise the disposition of his estate in accordance with with provisions of his will."

Martha closed her eyes, breathed deeply. She felt lightheaded. The room was full of sounds: the rustle of papers, the squeak of chairs, the disorderly babble of voices, the rap of the judge's gavel.

She opened her eyes and turned toward Malinowski. Leon was as still as the water at the bottom of a deep well. He sat just as he had before, hands on his lap, looking at the far wall.

The decision of the court left Leon Malinowski with no financial resources but the fifty thousand new dollars on deposit in his name with Farragut Trust in Boston. Most of this was wasted in appeals and legal fees. He later wrote a book describing his experiences. It was titled *Another Stolen Life*. It was not a commercial success.

Martha Prouse decided to take a long rest after the hearing, but she found she could not relax. Beginning with the fall semester of 2012, she resumed university teaching, though of course she had no need for the money. At first her notoriety caused high enrollments in her classes and made it difficult to teach, but eventually that, and her memories, faded.

IN THE SPRING OF 2019, Martha and Danny Ruiz, with whom she had lived for a year, went to a baseball game in Aziz—the city that had once been the Bronx, before the upheaval of the first decade of the century changed all that. The game was an exhibition between the New York Yankees (though New York no longer existed, the traditional name persisted) and a team from the Midwestern Protectorate which had not been seen in the East for twenty years: the Kansas City Royals. The game was the beginning of a goodwill tour by the midwesterners, groundbreaking for a re-establishment of diplomatic relations between the hostile nations.

The government could not have selected a better day had it been manufactured. Pleasure boats with colorful sails dotted the East River, and both the parklands surrounding refurbished Yankee Stadium, and the white marble entrances among the groves of trees that marked the ramps and lifeways to the underground city, shone with pristine clarity in bright sunlight. Martha and Danny had box seats right on the first base line. They got there early, and sat watching the grounds crew tailoring the grass of the infield and outfield, laying chalk to mark the baselines.

As she sat there tending idle thoughts, Martha's eye was caught by one of the men directing the boys who pushed a roller around the dirt of the pitcher's mound. He was tall and pale, balding, and stood patiently as the young men worked, directing them now and again with a quiet word. He had gained weight and shaved off the mustache. It was Leon.

She was not sure what she should do, but when the crew came to groom the dirt around first base, she saw him gaze absently into the stands, shoulders erect, head lifted.

THE INCREDIBLE LIVING MAN

Something in his attitude pulled at her. She ignored Danny's conversation; she knew she had to speak to him.

"Leon!" she called, waving her hand rather timidly. "Leon!"

His head jerked as though he had heard her; his eyes searched the stands. Then he looked right at her. He didn't move.

"That's not . . ." Danny asked.

"Yes, it is. Leon!" she called again.

Leon stared at her and made no motion toward her. He looked old, weathered in the spring sunlight, and extremely patient. He was waiting for something.

Martha knew what it was.

"Stephen!" she called then, much more quietly.

The man smiled tightly, waved a hand at the grounds crew, and walked toward the box. He came up to them, folded his arms and leaned on the wall.

"You said the magic word, lady. But for you, no prize."

Martha felt herself on the defensive, but refused to give in. "You insist that we play games?"

Leon closed his eyes for a beat, opened them again. He extended his hand to Danny. "How do you do," he said. "I'm Leon Malinowski."

"Danny Ruiz."

"Nice to meet you. Going to be a good game today. I hear these guys can hit."

"We watched them take batting practice."

Frustration was growing in Martha's chest, and something else. "How are you now, Leon?" she asked.

"I get by. I've settled down—a new life." He smiled that tight smile again.

Martha was falling into confusion and distress; she hadn't felt so out of control of herself in years. Hesitantly, she put her hand out to touch that of the stranger. He looked as if he would draw away for a second, then he did not. The gray eyes were as veiled as they had ever been.

"Please, Leon—Stephen. You don't know how it's hurt me not to know for so long. I want to know how you are. Do we have to go on like this?"

The muscles of the man's jaws clenched. "It hurts, does it? I'm so sorry. It did seem to me that I was the one being asked to 'go on like this'. But perhaps my memory is faulty. I've been told I tend to forget important things."

She couldn't say anything. Her silence weighed on them. She could hear the huge sound of the crowd, like the surf, a meaningless white noise washing around them.

The groundskeeper's eyes were still locked on her. He took his hand from beneath hers: he suddenly looked more sad than angry.

"I am sorry," he said, sarcasm gone. "I didn't mean to hurt you, really, Martha. The truth—that would be better for both of us, wouldn't it?"

She looked blankly at him.

He stepped back from the box and spread his hands slightly at his sides. The portrait of the ageing caretaker.

"So here I am, Leon Wenceslaus Malinowski. Fifty years old on May second. Assistant groundskeeper, Yankee Stadium. Degree in history, Amherst, '91. Married once." He blinked rapidly—perhaps only squinting against the sun.

"Stephen Wheelwright? Dead for many years."

He turned and trotted back toward his grounds crew, which had moved on to second base.

"Stephen!" she called after him. He didn't turn.

Soon the teams took the field, and the game began. —G—

John Kessel/Kevin O'Donnell, Jr.

TUNNELS OF THE MINDS

[continued from page 55]

night . . . springy boughs on the floor, perfume in the air, warmth and ecstasy in his arms . . .

He was quivering with fear and sorrow and anger. Quassa tried to soothe him, her hand cool on his flushed cheeks, her wordless hum gentle on his ears. He clutched her, like a fallen man in a mountain river clutches a rock, and smelled her clean womanliness. Trying to shout through the maelstrom to her but failing, he kissed her, first on the forehead, then on the cheek, then, with a different, growing sort of urgency, on the lips.

She responded. Eyes closed, mouth open, she grasped his shoulders, squeezed them, stroked them. She wouldn't let go of him, not then, not ever.

Nor would he release her. The Chief's men would have to tear them apart, break his arms, find handholds in his hair. The doomed man demands a last taste of life. The exiled insists upon gazing at his homeland before stumbling away. The deafened longs to hear, for a final time, his name called with love.

Oh, Yaran!

So little time; so much desire. And so confusing that terror should arouse him . . . they would have been each other's had the Silent Ones not come. They would have loved, and shared, and raised many, many children. Her lips would always have been so soft and moist; her breasts always so firm and inviting.

Death entered the tent, but Yaran, with the instinctive wisdom of a field mouse, buried himself in life.

From the shadows, Grandfather watched anxiously. His mind perched on the brink of the whirlpool, and listened while determination faded. There was nothing he could do to help either of his kinfolk except . . . tired, fleshless hands scabbled in the darkness for Yaran's bow and quiver. Ancient muscles groaned as they drew back the bowstring. He propped himself up and hollered, *Chief!*

Yes? wheezed the impatient voice.

A great peace willed up from the pallet. Feel that?

Of course.

First warrior to enter without my say-so gets an arrow in his gut.

Oh? Probe. Understanding. Appreciation. I see.

I bet you do. His ears heard a faint moan. You might tell the women to see if Quassa needs a hand.

I already did. The impression of a chuckle passed between them. Well over an hour ago. Didn't the girl look different?

Oh? He resisted the impulse to swivel around. The tent bow isn't necessary, is it?

No. Listening. But as of this moment, a marriage ceremony is.

The old man smiled and said nothing.

Behind him, Yaran and Quassa were saying everything.

—G—

Doomsayer

Murphy

F

OOLSI

1996 is a good year, the kind one never tires of. Blimps are back. Railroad and steel worker strikes, tariffs, and capital-draining taxes have brought heavy transportation in the United States to a dead halt. There being only one railroad, and government management being what it always is, hundreds of small entrepreneurs have gone into the blimp business. These whales of the air, brought back for one brief moment of glory, are an instantly endangered species in a sea of bureaucracy. Lightweight plastic fabrics and "numerals" have made it possible, finally overcoming years of government regulation designed to protect everyone from the cotton growers to the established airlines. But you can thank a political power play in the Supreme Court for the actual decision which made the federal restrictions unconstitutional. Never try to bribe a chief justice. They are very self-righteous.

One hundred tons of oranges can be shipped from the Imperial Valley in California to New York City in eighteen hours or less at one-quarter the railroad or trucking cost. Most fresh vegetables shipped this way need no refrigeration, thus saving further costs. Melons ripened on the vine in Georgia on a Tuesday are eaten for dinner in Minneapolis on Wednesday. Farmers, able to raise their share of the food dollar by using independent shippers without raising the price to consumers are the only lobby in the country to be completely happy. The nation's poor

may be eating better for less, but that is attributed to the good work of politicians in power, not the greedy little "Blimpers" making it possible. Every special interest group sees their position threatened by a Nineteenth Century free-for-all. Several Senators have delivered speeches about wind-fall profits and the tax adjusters are taking notice.

The personal blimp is still under strict federal regulation, and though proven relatively safe, is being kept off the market—to the relief of Detroit, which has spent millions in donations to the politically "right" non-profit organizations (old-age homes for bureaucrats thrown out of office) and sponsored repeated re-runs of an old movie about the *Hindenberg* disaster. The automobile workers union, which has been most vocally opposed to the blimp business in the past few years, has taken steps to cover all bases by organizing a blimp workers union and pushing Congress for a law which would indirectly force the unionization of all the hundreds of independent blimp shops around the country.

Nevertheless, blimp transport, though slower than jet travel, is about to make inter-city transportation so cheap that Greyhound and Trailways will both sell off their road-bound fleets to municipal governments and move into the air-business almost exclusively. Intercontinental jet traffic will be all that survives

the economic squeeze, and even there the luxury air-ship will make the one-day journey most palatable, with "airbus" traffic from Boston to Paris costing about \$1200 (only \$98 in 1980 U.S. currency). The big ships, measuring out at twice the length of a football field, are shaped so much like huge fish that they have spawned a boringly aquatic bunch of brand names (the Boeing Shark, the Douglas Dolphin)—but don't worry, if all this seems too rosy, there's more. I can't tell you what you're gonna lose without first telling you what you had.

1996 is the first year of the great blimp boom (or LAV, for Lighter than Air Vehicle, as the Gov is wont to call them—folks just seem to like the name

blimp better, though). It will take almost twenty years for the unions, politicians, and other assorted criminal types to get their fingers around the pie. As a result, in 2019 there will only be six blimp manufacturers left—mostly owned or controlled by the old corporate forces of the late Twentieth Century—most adept at manipulating the power which people just keep giving to their big brother. All workers will be under the newly reorganized Transportation Workers International, with more than enough clout to stop any foolish dreamer from coming up with a better blimp. Regulations from the Departments of Transportation have made the cost of entering the field prohibitive. Ecological groups have successfully passed laws to restrict the use of “nu-metals” because they are not biodegradable. The nu-metal industry itself soon will be nationalized into the steel and coal trust. The cost of food has, apart from the always-present inflation of the currency by the Treasury presses, driven the cost of tomatoes back to prices comparable to those at the turn of the century. The farmers are on strike. The black market in food is growing so fast there is little attempt to hide it (one newspaper ran a picture of the State Governor buying peaches at an open black market in New York)... And, by the way, that tire company that once used a blimp to advertise itself—the rubber workers union put it out of business when it refused to sell its shares of one of the early prototype blimp-transport units. *C'est la vie!*



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Interview: Gregory Benford

Jeffrey Elliot

DR. GREGORY BENFORD is Associate Professor of Physics at the University of California, Irvine. He is a theoretical physicist, with a research interest in plasma turbulence and the dynamics of relativistic electron beams. His articles on science appear frequently in several national magazines, among them *The Smithsonian* and *Natural History*. He has published four science fiction novels, including *Deeper Than the Darkness*, *Jupiter Project*, *If the Stars Are Gods* (with Gordon Eklund), and his latest work, *In the Ocean of Night*. In addition, he has written over 30 short stories, many of which have appeared in various science fiction anthologies. In 1975, Dr. Benford was awarded the Nebula Award for the best short fiction of that year. The author is married, and lives with his wife, Joan, in Laguna Beach, California.

Elliot: Do people read science fiction to learn science?

Benford: I think most science fiction readers enjoy the process of science and, of course, its various trappings. I don't think people read science fiction to learn science, any more than people read historical romances to learn history. The reality of science, however, is extremely important. Science is now the conventional wisdom. It has replaced religion in a very real sense. Science fiction which reflects that reality has great power. As I see it, science fiction evokes a certain verisimilitude, a certain ambience, which it captures by being precise and scientifically accurate. Of course, not all

science fiction works which lay claim to being exact live up to that standard. It's very much the old shell game. In truth, though, science fiction doesn't really have to be scientifically plausible; it only has to appear to be plausible. The real question is, then, where is that dividing line?

Elliot: In general terms, how accurate are most science fiction works from a scientific point of view?

Benford: Not very accurate. In fact, most science fiction is quite shoddy. If you really mean science, or how science is done, then there is very little "good" science fiction. If you're talking about the landscape of science, or the backdrop of science, then there is much more "good" science fiction. As a working scientist, I rarely come across science fiction which shows what it's

like to be a "real" scientist. The most common hero in science fiction literature is not the scientist, but the captain of the spaceship. Science fiction is more often about exploration in the physical sense, than it is about the expansion of the intellect.

Elliot: Is it fair to fault science fiction for not being technically accurate?

Benford: Yes and no. Certainly, there are numerous examples of exceptionally bad things done in science fiction. On the other hand, the reason that most science fiction writers fail is because they're undertaking something that is very difficult to bring off effectively. Most people who write conventional fiction have no concept whatsoever about the "real" world. To them, the world is essentially orchestrated by a strange machine operating off stage,



Photo credit: Richard Todd

producing all sorts of new ideas, new pieces of technology, which no one appreciates or knows how to use. That's a false picture, but it's not a misrepresentation of what the artist feels. Most fiction writers don't have the faintest idea of what's happening. They're essentially ignorant of the modern age. As a result, they write about the times in which they grew up. And they never seem to tire of reproducing their own narrow view of the world. But, in fact, the world has gone on. Modern society bears little resemblance to the society pictured in so much of the humanistic fiction written in the past. If science fiction fails, then, it's because it is charting new directions, new conceptions of the universe.

Elliot: How important is it for a science fiction writer to be well-versed in the sciences?

Benford: It never hurts to know things. The crucial thing is knowing when you can fake it so that the reader can't tell. If the story appears plausible, factual, and accurate to 90 percent of your readers, then it doesn't really matter that it all came out of the encyclopedia. In this way, science fiction has things in common with detective or crime fiction. When you write a cop story, or a murder mystery, you know that approximately 5 percent of your readers really understand police procedures or various kinds of weapons. Even the best detective writers, people like John D. MacDonald, foul up things now and then. But it doesn't really matter because 95 percent of the people won't catch it. And ultimately, that has to be your standard. There are times, also, when scientific accuracy conflicts with dramatic necessity. The difference between a mere technician and a real artist is that the latter knows when to sacrifice accuracy for the sake of drama, and when to lie. That's what makes it an art. The errors, therefore, are not particularly important so long as they're not easily detectable. Actually, a writer ought to know at least ten times as much about a subject as he describes in his book. What a writer puts into a book very much resembles the tip of an iceberg. The reader subconsciously understands the fact that the writer really knows more than he's letting on—that all of the various pieces of a story will eventually fit together. The real trick is creating a sense of verisimilitude throughout the numerous details presented in a story. If a writer can do that, then he's got the reader

hooked. He'll believe anything!

Elliot: Why does so much science fiction focus on astronomy as opposed to the other sciences?

Benford: It's the biggest canvas there is. There's nothing bigger than the universe itself! Moreover, people are inherently interested in astronomy. You can always fill up an auditorium by presenting a talk about life in the universe, or the origin of the universe, or even the death of the universe. The astronomical canvas is, after all, the only agreed-upon frontier we have left. And it's so immense, so filled with wonder, so bizarre. Our planet is well explored. There are no lost cities left out there in Africa or India. There are no lost tribes left to uncover. There are no gigantic creatures lurking in the waters of Antarctica or the South Pacific. The only ground left which still has certain exotic qualities is up there in the sky. Moreover, everything astronomical is literally astronomical; it has an immense impact on people. One of the discoveries that has come out of the last century, it seems to me, is that we live in a very comfortable pocket of the universe, for which we've been designed, not the other way around. This is very apparent once you get out, above the thin skin of the atmosphere. Science fiction brings this truth to the fore. It's a fact, unfortunately, that many people don't like. But it's unavoidable. And some people, by embracing it, like the UFO people, get a larger perception of the world. It's this ability to get longer perspectives, to get wider scopes, that attracts people to science fiction, particularly the astronomical kind of

science fiction. Usually, this means the "hard" kind of science fiction—namely, rocket ships, strange planets, etc. That's one reason, though, that most of the prominent science fiction writers write "hard" science fiction.

Elliot: In what sense does science fiction define the possible?

Benford: Without basic constraints on what is possible, science fiction becomes science fantasy. The constraints in science fiction are analogous in many ways to the meter and rhyme of a sonnet. You can't write a sonnet just any way. You can only write it within a very narrow set of constraints. Much of the power that science fiction claims comes from the fact that it is forced to be scientifically accurate within limits, or, at the very least, scientifically plausible. This forces the science fiction writer to play fair. There's nothing worse than science fiction which people can plainly see is sheer nonsense. The fact that something could, in fact, occur, is one of our biggest trump cards. If it couldn't happen, then it's essentially a fantasy. If you hook people on the fact that a book is science fiction, only to shift gears midway through and embrace fantasy, then I'm afraid that you're likely to engender an awful lot of disgruntled readers, and rightfully so.

Elliot: From your perspective, should science fiction adopt a didactic function—that is, should it attempt to teach people things?

Benford: Again, I don't think people really read science fiction to learn science. They're more interested in the novel of process. As a result, people don't mind being lectured to so long as



it's predicated on setting forth a "real" world. The older people get, the more impatient they become with didacticism in fiction. Heinlein always said that he could get his juvenile readers to sit still for a lot more lecturing than he could his adult fans. I'm not really sure he's correct, however. If you notice, particularly in his later books, there's an immense amount of talk. However, most of the talk isn't over how things work, but rather what they mean. Indeed, much of this talk is no more than social analysis. For my money, I would rather hear what a technician like Heinlein has to say about how things work, than what they actually mean, because I don't think science fiction writers are especially perceptive in their understanding of political processes or social phenomena. In the long run, science fiction is a

Benford: No. I don't start out feeling that I have to teach anybody anything. I get paid by the University of California to teach people things, and it's a whole lot easier if you can use a blackboard instead of a typewriter. For me, writing is play. I'll be damned if I'm going to sit down and write with any special obligation in mind. I like entertaining people, but basically I write for myself. I write for kicks. I don't feel as though I have a cause. Basically, I think that every writer who really considers himself an artist is, in the end, trying to give himself away. There are numerous explanations as to why people write. The conventional explanation holds that it's a form of neurosis. I wouldn't argue that fact. I would argue, instead, that everybody is neurotic. Why should writers be any different? And so, I'm

attempt to get at this point. It's a novel which looks at every problem from several different angles or points of view. Science is not one thing. Religion is not one thing. And people are not one thing. In a sense, the book is a polemic against simplistic social theories which, I think, represent a real threat to our society. After all, we've come up with numerous social theories, many of which millions of people have died to preserve. Fascism, for example, is an idea which could be demolished by a genuinely sensitive human being in less than five minutes of debate. Another similar idea, to me, is traditional Marxism, which still besets Europe, and which is so simple-minded—despite its claim to being a science—that it cannot even explain the most elementary social facts. Instead of these dogmatic views of the world, we desperately need new societies which are capable of genuine compromise, which can deal with the real subtleties of human beings, instead of legislating "top-down" answers for everybody. In fact, I think that's part of the genius of the Anglo-American countries. They've evolved a system, which has built into it the capacity for muddling through, for compromise. We must learn to let people work intuitively on problems, instead of programmatically.

Elliot: Do you get disturbed when you read science fiction which does violence to known scientific fact?

Benford: I'll usually do actual violence to the book or magazine which I'm reading at the time. I've been known to throw books across the room and break their spines as they hit the opposite wall for such transgressions. Seriously, it disturbs me because it's dishonest. It's like playing cards with a good friend who suddenly pulls a trump card out of his sleeve. I feel cheated. I think a lot of readers feel cheated. It's deceitful packaging to cheat on scientific credibility out of laziness. Unfortunately, a lot of science fiction writers are pretty lazy. I don't want to sound like a purist on this point. Obviously, it's a matter of taste. One of the reasons that science fiction has a bad reputation, though, is because it does tend to finesse the facts much too often.

Elliot: What role does "awe" play in science fiction?

Benford: In the long run, I think, people like the verisimilitude and plausibility which science brings to science fiction. What everything is working toward, though, is that sense of "awe" at the



Photo credit: Richard Todd

lot better at cosmic consciousness than it is at social consciousness.

Elliot: How well does science fiction portray the realities of this scientific process?

Benford: Not very well. Very little of science fiction is really about how things are discovered in science. In fact, almost all science fiction is really about technology. It's not about science as the discoverer of new truths about the universe; rather, it's about the implications of technology, or contact with aliens which reveal social differences, or various extrapolations of major social trends. Very little science fiction actually addresses the sciences. And scientists know that.

Elliot: As a scientist, do you feel any special obligation in writing science fiction?

writing for these unanalyzable reasons, and not to educate somebody or convince them that I have the key to the future. It's true, I have ideas about what I think is happening, but I'm not convinced they're true. Where I part company with most science fiction writers is that I don't have a program for the future. I don't think I know all the answers. As I get older, I'm more and more convinced that most problems are extremely complex; that the first step toward solving them is to recognize how complex they are, and not to seek simplistic solutions or explanations. The worst thing about science fiction, the thing which gives it its adolescent tinge, is the tendency to embrace easy answers, handy aphorisms, which demolish whole schools of thought. My new book, *In the Ocean of Night*, is an

magnitude of the universe. After all, it's so damned big! If you live in this vest-pocket universe of ours, where nobody ever goes more than five miles up or down with respect to the center of the earth, then you get a sense of how much history has been played out in this little wedge of space. It's really a thin scum on the surface of the planet. In a sense, it's like being dwarfed by, and yet encompassed by, the immensity of the world we know. It's extremely reassuring to realize that you're part of a process. As I see it, we're an inevitable outcome of the evolution of matter. Intelligent life is a natural consequence of this situation. We're not divorced from the universe, but we are, as some would argue, the point in the universe. In a real, as well as a metaphorical sense, the universe is struggling to understand itself. This fact is often found in people's acceptance and perception of religion. And I don't think it's a bad religion, if you want to look at it that way. It's certainly a lot better than the sort of religion which tells you that you ought to go over the hill and kill your neighbor in order to expand the vision of Allah, or Jesus, or any of the wise men whose teachings have been so perverted by their followers throughout history.

Elliot: Are most science fiction readers capable, from your point of view, of understanding the enormous complexities of science? Aren't science fiction writers forced to dilute scientific explanation in order to reach those readers who may not have a scientific background?

Benford: Yes. And frequently they have to dilute it themselves in order to understand it. Most science fiction writers don't go in for the "hard" stuff. Few of them read scientific periodicals. I'm probably unique among science fiction writers, in that I get almost all of my science directly from the scientific journals. I don't read popular scientific journals often. Sure, you have to explain things, but that doesn't mean you must lose their essence. It's possible to talk about science, and not falsify it, and do so in simple terms. Many scientific ideas are subtle, but not complicated. They require genuine insight in order to explain, but they can be explained to ordinary people. I don't think you have to talk down to readers. I think you can, in fact, use scientific things as a metaphor. You can treat scientific ideas as things which pass by in the reading of a novel, almost at the edge of vision,

Interview

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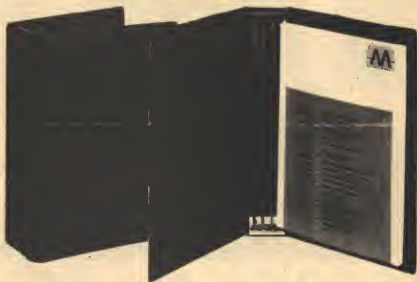
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so that the reader will get a feel for the movement of ideas taking place off stage. This perception is often very useful in an artistic sense, as well. Sometimes it doesn't help to bring everything on stage and didactically lead the reader through points A, B, C, D. Instead, let him see a few of the consequences, get the feeling of the battle of voices that science really is.

Elliot: Does science fiction ever give rise to scientific invention?

Benford: Certainly. A fellow wrote a paper on this recently and documented numerous cases in which this occurred. I'm aware of several people who have invented things by having had them in the back of their mind from a science fiction story they read. Fundamental scientific discoveries, though, like the theory of relativity or the theory of

Getting people to accept change, though, is an important accomplishment of science fiction.

Elliot: What substantive advantages, if any, does a working scientist bring to writing science fiction?

Benford: Well, there are obvious disadvantages. First, you don't have any time. Second, your training isn't in the verbal arts. Third, there's a bias in the scientific community against science fiction. The advantages are also obvious, the main one being that you know more science. This can also be a disadvantage, in the sense of using it in a straightforward mechanical sense without much artistic dexterity, the result being a very plodding kind of fiction, one that doesn't go beyond the obvious scientific research. The real secret in science fiction is not in seeing

scientist, if you're an experimentalist, involves being in the laboratory a good deal of the time. If you're a theoretician, on the other hand, most of your time is spent with books, words, math, pencils, paper, etc. In this blackboard universe, there's not a lot of time left for outside reading. Most scientists spent considerable time reading science fiction when they were younger, probably because it correlated with many of their interests in science. Early on, though, they lost that first ephemeral glow that you get when you first encounter the ideas associated with science fiction, and they ran into the inevitable problem of 90 percent of what they encountered being dross. They became sickened on it, much the same way that children are sickened on too much candy, and gave it up for other interests.

Elliot: Is there any onus attached to a scientists writing science fiction, especially in the scientific community?

Benford: Yes, very much so. Few scientists write science fiction. Even fewer do it well. Science fiction is a put-down word in the culture as a whole. "That's not science fiction, it really happened," is the standard way of putting it. Among scientists who read a lot of science fiction as kids, and then abandoned it for the more tough-minded discipline of a graduate school education and beyond, science fiction appears to be a childish affectation, one which they put away with their baseball mitts and marble collections. Now, to see a colleague writing science fiction, is viewed very much like "slumming"; either because he can't do any better or, God forbid, he thinks it's worthwhile doing. Obviously, I don't agree with this point of view. On the other hand, there's a definite asset in doing something that people don't quite view as proper or seemly. If I were to make up a rancid analogy, I would rather have played jazz in the 1920s, when it was viewed as a crummy, dirty, lower-class activity, when a lot of good stuff was being done, than to play it in the 1960s, when it had already become embalmed. I think the same thing might happen to science fiction. The people who write science fiction today do so, by and large, because they love it. As a result, they're more likely to do a much better job at it than the people who happen along several decades from now and write it because it's an accepted literary form.

Elliot: What makes a book exciting in your mind?



Photo credit: Richard Todd

evolution, don't come out of science fiction. How could you expect them to? There has never been a science fiction writer who was a first-class scientist of the "innovative" variety. And that's no accident! However, in bringing forward the idea that new things exist, that new things will happen, that change is built into the nature of things, science fiction has generated a good deal of innovation, as well as acceptance. First, you have to overcome the fear of innovation. And science fiction is very good at that, especially these days. Everybody now accepts, I think, the point of view that science fiction has always embraced—namely, that the future will be considerably different from the present. Unfortunately, most experts feel that it will be definitely worse, a view with which I'm not necessarily in agreement.

the next effect or scientific revelation, but in seeing the unforeseen, the second generation. Scientists aren't necessarily any better at that than science fiction writers or futurologists.

Elliot: Do many scientists read science fiction?

Benford: Probably 10 percent. However, 50 or 60 percent read it when they were younger. Most of them, though, abandoned the practice somewhat before they abandoned almost all reading entirely. Most scientists don't read widely in other fields. They tend to read mostly non-fiction, when they read at all. They don't usually keep up with the top fiction writers. I suspect this is true because they're saturated with the printed word already, what with all the time they spend reading and writing in their discipline. The process of being a

Benford: For me, a book is exciting when it deals with problems in a multi-layered way, primarily because that's how I view the world. I don't like categorical books, those which put a rubber stamp on the universe and say, "This is how it is!" So I relish books which show people new ways of viewing life, innovative and strange ideas, unanticipated twists of plot, and artistically conceived characters. Obviously, this is no easy task, which explains why, I suppose, so many writers fail. Basically, I have a writer's tastes as a reader. To some extent, that's a very specialized interest. I enjoy seeing the props being moved into place, the actors mumbling as they get set to come on stage, the excitement and electricity in the air, and all the rest of the drama and pathos which surrounds the story.

Elliot: Do you view "hard" science fiction as preferable, in any way, to "soft" science fiction?

Benford: No. No more than hard ice cream is better than soft ice cream. Both of these approaches incorporate assumptions and constraints which make it possible to produce first-class work. The results can be innovative and exciting regardless of the approach. It so happens, though, that people have invested more time and effort in writing "hard" science fiction as opposed to the "soft" kind. After all, much of science fiction is predicated on new technological innovations. The future is likely to be different not because we decide to change it, but because we are forced to change as a result of new inventions and the social consequences of those inventions.

Elliot: Who are your favorite "hard" science fiction writers?

Benford: Oh God, that's a tough one. Generally speaking, my standard boils down to this: If I walk into a bookstore, whose work will I immediately pick up and buy? Typically, I'll buy a new Heinlein, a new Anderson, a new Clarke, and a new Niven. It's difficult to answer the question, mainly because I've often heard something about the book before it comes out. That usually determines what I'll read more than anything else. In truth, though, all science fiction writers are occasionally brilliant. There's not a person in the field who doesn't occasionally turn out a magnificent piece of work. That's what makes the field so interesting!

Elliot: As you see it, can science fiction have a humanizing impact on its readers?

Benford: Yes. Certainly, science fiction has a bigger canvas than the canonical, "Oh, the pangs of being black," or "Oh, how tough it is being a woman." I don't mean it's better than these forms, but it certainly has inherently bigger concerns. There's no question that science fiction can broaden one's horizons. If it tells you the fact that we, as a species, are a fragile race of people, a very ephemeral sort of animal, swimming on this thin skin of atmosphere, against a universe which is not hostile but perhaps, even worse, is merely indifferent, and you didn't know that before, then it is certainly making an important social contribution. Generally speaking, my impression is that most people have yet to grasp this fact. Insofar as science fiction reflects what's going on in the real world, as science has given it to us, then, of course, it can significantly expand people's horizons. I think that's why so many people are turning to science fiction as a literary interest. After all, how many times can you watch "Starsky and Hutch" work over the same thug in an alley, and feel that the world has anything in it worth living for?

Elliot: Finally, as a scientist, why do you both read and write science fiction?

Benford: God knows! I like the playfulness of the ideas and the occasional chilling shock of meeting something that I've never thought of before, something that's genuinely strange. It's these kinds of unexpected encounters with the genuinely different that I like best of all. It's very much the same reason that I enjoy doing science. In physics, I really enjoy model building, making up schemes whereby new physical processes could take place. I've found them to be much more innovative, and far more risky, than working with the conventional wisdom. I like to invent new ways of doing things. I like to play with little-understood ideas—antimatter cosmologies, galactic evolution, etc. The feelings of writing science fiction and doing science are not that much different. In both cases, I enjoy a similar creative feeling, one that's difficult to put into words. It's very much like building a new continent in the air, inventing a new reality with new truths, one which forces a writer to test his own creative wits and come up with something significant. It's that test which gives me great satisfaction.

—G—



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The Aleph

Andrew A. Whyte

[Note: Due to personal reasons, Drew was unable to make his usual comments on individual titles this time out. We hope the addition of new categories will compensate regular readers until next time.]

For the sake of brevity and convenience, certain abbreviations have been supplied as a reference code. They will be found on the same line as the author's name, on the right-hand side. Here is a key: (C) Collection (more than one story by the same author); (C+) Story series collected or collection with unifying theme; (F) Fantasy; (J) Juvenile; (O) Omnibus (Collection containing at least one novel). Since sci novels make up the majority of books listed, none of these are specified as such. We have recently added new symbols to deal with the increasing amount of illustrated fiction. (GN) Graphic Novel; (G5) Graphic Story; and (GC) Graphic Collection—are used to denote books of which approximately equivalent portions are shared between text and artwork.

ANDERSON, Poul
The Avatar
Berkley-Putnam/October/\$10.00

BAKER, Scott
Symbiote's Crown
Berkley/October/\$1.75

BALLARD, J.G. (C)
The Best Short Stories of J.G. Ballard
Introduction by Anthony Burgess
Holt, Rinehart & Winston/October/\$12.95 & \$7.95

BEAGLE, Peter S. (F)(O)
The Fantasy Worlds of Peter S. Beagle
Viking Studio/October/\$12.95[?]

BESAW, Victor (F)
The Sword of Shandar
Manor/September/\$1.75

BOVA, Ben (C)
Maxwell's Demons
Baronet/September/\$5.95



BUDRYS, Algis
Blood and Burning
Berkley/September/\$1.75
BURGESS, Anthony

1985
Little, Brown/October/\$8.95

BURGO, Joseph
The Lights of Barbrin
Pocket Books/September/\$1.75

BUSBY, F.M.
All These Earths
Berkley/September/\$1.75

CARTER, Lin
The Pirate of World's End
[The Fifth Book of the Gondwane Epic]
DAW/October/\$1.75

CARVER, Jeffrey A.
Star Rigger's Way
SF Book Club/September/\$1.98+
Dell/September/\$1.75

CHALKER, Jack L.
Exiles at the Well of Souls
[Second in a series]
Ballantine-delRey/September/\$1.95

CHERRYH, C.J.
The Faded Sun: Shon'jir
[Second in a trilogy]
SF Book Club/October/\$1.98+
DAW/1979

CLAYTON, Jo
Irsud
[Aleutys series, No. 3]
DAW/September/\$1.75

COMPTON, D.G.
A Usual Lunacy
Borgo Press/October/\$3.95

COULSON, Juanita
The Web of Wizardry
Ballantine-delRey/October/\$1.95

THE FANTASTIC ART OF BORIS VALLEJO



(C) DARNAY, Arsen
Karma
St. Martin's Press/October/\$8.95

DAVIDSON, Michael
Daughter of Is
Popular Library/September/\$1.50

(F) deCAMP, L. Sprague (C+)(F)
CARTER, Lin
NYBERG, Bjorn
Conan the Swordsman
Illustrations by Tim Kirk
Bantam/August/\$1.95

delREY, Lester (C)
The Best of Lester delRey
Introduction by Frederik Pohl
Ballantine-delRey/September/\$1.95
SF Book Club Alternate/December/\$3.98

DELANY, Samuel R. (GN)
and CHAYKIN, Howard
Empire
Illustrated by Howard Chaykin
Produced by Byron Preiss Visuals
Berkley-Putnam/October/\$19.95 & \$9.95

DICKSON, Gordon R.
Pro
Illustrations by James Odbert
Ace/October/\$1.95

DWIGGENS, Don (J)
The Asteroid War
Illustrated by the author.
Golden Gate Junior Books/September/\$7.35

EKLUND, Gordon
Lord Tedric
[First in a series]
Baronet/September/\$4.95
Ace/November/\$1.95
After characters created by E.E. "Doc" Smith.

GOULART, Ron
The Wicked Cyborg
[Barnum series]
DAW/October/\$1.50

- HOUSTON, David
Alien Perspective
Leisure Books/September/\$1.75
- HOWARD, Robert E. (C+) (F)
Kull
Bantam/September/\$1.95
- Queen of the Black Coast**
[Illustrated Conan series, No. 7]
Illustrated by Michael Hague
Donald M. Grant/October
- JONES, McLure (J)
Cast Down the Stars
Holt, Rinehart & Winston/September/\$6.95
- KAPP, Colin
The Ion War
Ace/October/\$1.95
- KESTEVEN, G.R. (J)
The Awakening Water
Hastings House/October/\$5.95
First published in UK (1977) by Chatto & Windus.
- KURTZ, Katherine (F)
**Saint Camber: Volume Two in the
Legends of Camber of Culti**
[Fifth in Deryni series?]
del Rey/October/\$9.95
- LAWRENCE, Louise (J)
Star Lord
Harper & Row/October/\$7.95
- LEIBER, Fritz (C+) (F)
Bazaar of the Bizarre
[Fafhrd & Gray Mouser series]
Illustrated by Stephen Peregrine
Donald M. Grant/October
- LEM, Stanislaw
The Chain of Chance
Translated from the Polish by Louis Iribarne
Harcourt Brace Jovanovich/August/\$7.95
- LUPOFF, Richard A. [editor]
Cosmos
A round robin novel—18 top authors of the 1930s.
Illustrations by Don Simpson and others.
Pennyfarthing Press/September(?)/\$15.00 & \$5.95
- LUSTBADER, Eric Van
Dal-San
[Sunset Warrior series No. 3]
Doubleday/October/\$7.95
- McCAFFREY, Anne
Dragonflight
[Volume one of *The Dragonriders of Pern*]
del Rey/October/\$8.95
First U.S. hardcover edition.
- The Dragonriders of Pern** (O)
SF Book Club/October/\$4.95+
- MacDONALD, John D. (C)
Other Times, Other Worlds
Introduction by Martin Harry Greenberg
Fawcett Gold Medal/October/\$1.95
- MALZBERG, Barry N.
Chorale
Doubleday/September/\$7.95
Expanded from a story in *Graven Images*.
- Drew Whyte**
- MARK, Jan (J)
The Ennead
Crowell/September/\$7.95
- MATHESON, Richard (F)
What Dreams May Come
Putnam/September/\$8.95
- "MOONCHILD"
Titans of the Universe
Manor/September/\$1.50
- MOORCOCK, Michael
The Condition of Muzak
[Jerry Cornelius tetralogy: Volume IV]
Introduction by Charles Platt
Gregg Press/June/\$13.50
First U.S. hardcover edition
First U.S. publication in a single volume.
- The Rituals of Infinity**
DAW/September/\$1.50
New edition of *The Wrecks of Time* (revised).
First publication: 1966 (U.S.) by Ace.
- NIVEN, Larry (F)
The Magic Goes Away
Illustrations by Esteban Maroto
Ace/October/\$4.95
- NORTON, Andre
Yurth Burden
DAW/September/\$1.75
- OFFUTT, Andrew J. (F)
Conan and the Sorcerer
Illustrations by Esteban Maroto
Sunridge Press/October/\$5.95
- PAGE, Thomas
Sigmat Active
Times Books/September/\$8.95
- PANSHIN, Alexei & Cory (F)
Earth Magic
Ace/October/\$1.95
Serial version published in *Fantastic* (1973) as
"The Son of Black Morca."
- POHL, Frederick
Jem: The Making of a Utopia
Galaxy/August-December
St. Martin's Press/1979
- PROCTOR, Geo. W.
The Esper Transfer
Major/October/\$1.50
Postponed from 1977.
- REAMY, Tom (F)
Blind Voices
Berkley-Putnam/September/\$7.95
SF Book Club/Fall/\$1.98+
Excerpt published previously in *Shayol* (Fall, 1977).
- REYNOLDS, Mack
Trample An Empire Down
Leisure Books/October/\$1.50
- ROBINSON, Nancy (J)
The Other Place
Walker/September/\$5.95
- RUCKMAN, Ivy (J)
Encounter
Doubleday/September/\$7.95
- RUSSELL, Eric Frank (C)
The Best of Eric Frank Russell
Introduction by Alan Dean Foster
Ballantine-del Rey/October/\$1.95
- SABERHAGEN, Fred
The Vells of Azlaroc
Ace/October/\$1.75
- SAPIR, Richard Ben
The Far Arena
Seaview/August/\$8.95
- SAVARIAN, Julian Jay
Walters on the Dance
[Lemmus Trilogy: Volume I]
St. Martin's Press/October/\$8.95
- SHEFFIELD, Charles
Sight of Proteus
Ace/September/\$1.75
- SIMAK, Clifford D. (F)
The Fellowship of the Talisman
del Rey/September/\$8.95
SF Book Club/December/\$2.98+
- SKY, Kathleen
Vulcan!
[A *Star Trek* Novel]
Bantam/September/\$1.95
- SMITH, David C. (F)
The Sorcerer's Shadow
Zebra/October/\$1.95
- STOKER, Bram (C) (F)
Under the Sunset
Newcastle Forgotten Fantasy Library/September/
\$3.95
- First U.S. publication.
- STONE, Josephine Rector (J)
Those Who Fall from the Sun
Atheneum/October/\$6.95
- STRIEBER, Whitley
The Wolfen
Morrow/August/\$8.95
- STRUGATSKY, Boris and Arkady (C+)
Noon: 22nd Century
Translated from the Russian by Patrick McGuire.
Best of Soviet SF Series/October/\$10.95
- THURSTON, Robert [adaptor]
Battlestar Galactica:
Saga of a Star World
From a screenplay by Glen A. Larson.
Berkley/September/\$2.25
SF Book Club/December/\$3.98+
- WALLACE, Ian
Z-Sting
[Cryod Series]
DAW/October/\$1.95
- WALLACE, Pat
The Wand and the Star
Pocket Books/August/\$1.95
- WALTERS, Hugh (J)
Murder on Mars
Faber & Faber/September/\$5.95

WARREN, George
Dominant Species
Illustrated by Kelly Freas.
Starblaze/September/\$4.95

WINDBURN, Charles
Slaves of the Eye
Condor/October/\$1.50

ZELAZNY, Roger
The Courts of Chaos
[Amber Series No. 5]
Doubleday/October/\$7.95

Anthologies

BAEN, James [editor]
Destinies #1
Ace/October/\$1.95

BOVA, Ben [editor]
The Best of Analog
Baronet/September/\$5.95

ALLIEN
St. Martin's Press/September/\$7.95
Title in U.K. (1977): *Novellas 1: Aliens*

EXILES
St. Martin's Press/September/\$7.95
Title in U.K. (1977): *Novellas 2: Exiles*

CARR, Terry [editor]
Classic Science Fiction:
The First Golden Age
Harper & Row/October/\$9.95

GEDULD, Harry M.
and GOTTESMAN, Ronald [editors]
Robots Robots Robots
New York Graphic Society/June/\$14.95

GRANT, Charles L. [editor]
Shadows
Doubleday/September/\$6.95

POHL, Frederik
and OLANDER, Joseph P.
and GREENBERG, Martin Harry [editors]
Science Fiction of the Forties
Avon/October/\$4.95

SILVERBERG, Robert [editor]
Alpha Nine
Berkley/October/\$1.75

TORGESON, Roy [editor]
Chrysalis Two
Zebra/September/\$1.95

SF Reference Works

CONTENTO, William [compiler]
**Index to Science Fiction Anthologies
and Collections**
Edited by L. W. Currey and David G. Hartwell.
G. K. Hall/March/\$28.00
Only 500 copies printed.

ELRICK, George [compiler]
The Science Fiction Handbook
[For Readers and Writers]
Chicago Review Press/September/\$8.95 (paper)

HOLDSTOCK, Robert [consultant editor]
The Encyclopedia of Science Fiction
Foreword by Isaac Asimov
Mayflower/October/\$16.95
An Octopus Book (UK).

LESTER, Colin [compiler and editor]
**The International Science Fiction
Yearbook**
Quick Fox/September/\$7.95 (paper)

NICHOLLS, Peter [general editor]
The Encyclopedia of Science Fiction
Doubleday/February, 1979/\$14.95
Included now to help avoid confusion between two
similarly-titled books.

ROCK, James A. [compiler]
**Who Goes There?:
Science Fiction Pseudonym Directory**
James A. Rock Co./POB 1431, Bloomington IN
47401.

TUCK, Donald H. [compiler]
**The Encyclopedia of Science Fiction
And Fantasy: Volume Two**
(Who's Who—M-Z)
Advent/February/\$25.00

WAGGONER, Diana [compiler]
**The Hills of Faraway:
A Guide to Fantasy**
Atheneum/May/\$16.95

WELLS, Stuart W. (III) [compiler]
SF and Heroic Fantasy Author Index
Purple Onion/July/\$21.95, \$15.95, & \$9.95

WOOD, Edward [compiler]
**A Connoisseur's Guide to Classic
Science Fiction**
Drake/November/\$6.95 (paper)

Essays and Interviews

DELANY, Samuel R.
The Jewel-Hinged Jaw
Berkley Windhover/June/\$4.95 (paper)
Reprint of 1977 Dragon Press Edition.

GREENBERG, Martin Harry
and OLANDER, Joseph D. [editors]
The Literature of the Science Fiction
Prentice Hall Twentieth-Century Views Series/
December/\$8.95 & \$2.95

RILEY, Dick [editor]
**Critical Encounters:
Writers and Themes in Science Fiction**
[Recognitions Series]
Frederick Ungar/October/\$9.95 & \$3.95 (paper)

WALKER, Paul [interviewer]
**Speaking of Science Fiction:
Sixteen Paul Walker Interviews**
Introduction by Tom Roberts.
Afterword by Samuel Mines.
Sketches by Dave Ludwig.
Luna Publications/August/\$18.95 & \$6.95

Autobiographies

POHL, Frederik
The Way the Future Was: A Memoir
delRey/August/\$8.95
SF Book Club alternate/November/\$3.98 +
illustrated with photographs.

CLARKE, Arthur C.
The View from Serendip
Ballantine-delRey/September/\$1.95

Illustrated Histories

HARRISON, Harry
**Great Balls of Fire: An Illustrated
History of Sex in Science Fiction**
Grosset & Dunlap/February/\$14.95&\$6.95 (paper)

**Mechanisms: An Illustrated Manual of
Science Fiction Hardware**
Reed Books/September/\$14.95 & \$7.95

KYLE, David
**The Illustrated Book of Science Fiction
Dreams and Ideas**
A & W/\$8.95

LUNDWALL, Sam J.
Science Fiction: An Illustrated History
Today Press/August/\$6.95 (paper)

ROTTENSTEINER, Franz
**The Fantasy Book: An Illustrated
History from Dracula to Tolkien**
Macmillan/September/\$7.95 (paper)
240 illustrations (40 in color).

SHECKLEY, Robert [text]
**Futuropolis: Impossible Cities of
Science Fiction and Fantasy**
A & W/November/\$14.95 & \$7.95 (paper)

SIEGEL, Richard
and SUARES, J. C. [compilers]
Alien Creatures
Reed Books/June/\$6.95 (paper)

TOD, Ian
and WHEELER, Michael
Utopia: An Illustrated History
Crown Harmony/May/\$14.95 & \$6.95 (paper)

"Future History"

COWLEY, Stewart
Spacecraft 2000-2100 A.D.
Book Sales, Inc. (distr.)/September/\$6.95 (paper)

SIEGEL, Richard
and BUTTERFIELD, John H.
The Extraterrestrial Report
Designed by Jean-Claude Soares.
A & W Visual Library/April/\$7.95 (paper)

WOLFE, L. Stephen
and WYSACK, Roy L.
**Handbook for Space Pioneers:
A Bulletin of the Galactic Association
(Earth Branch)**
Grosset & Dunlap/October/\$14.95
Today Press/\$6.95 (paper)

Showcase Collections

AUSTIN, Alicia
Alicia Austin's Age of Dreams
Donald M. Grant/October

FABIAN, Stephen
Fantasy by Fabian
Gerry de la Ree/June/\$15.00

FINLAY, Virgil
The Second Book of Virgil Finlay
Gerry de la Ree/July (?)/\$15.00

FRAZZETTA, Frank
Frank Frazetta: Book Three
Edited by Betty Ballantine
Peacock Press/September/\$7.95 (paper)

GIGER, H. R.
Necronomicon
Big O/August/\$14.95 (paper)

HILDEBRANDT, Tim and Greg
The Fantastic Art of the Brothers Hildebrandt
Edited by Ian Summers
Ballantine-delRey/October/\$15.00 (?) & \$8.95

VALLEJO, Boris
The Fantastic Art of Boris Vallejo
delRey/August (?)/\$12.95
Ballantine/August (?)/\$7.95 (paper)

WULFING, Sulamith
The Fantastic Art of Sulamith Wulfing
Edited by David Larkin.
Peacock Press/June/\$7.95 (paper)

Thematic and Narrative Art Books

ACHILLEOS, Chris
Beauty and the Beast
Simon & Schuster/September/\$19.95 & \$7.95

FITZPATRICK, Jim
The Book of Conquests
Dutton/October/\$8.95 (paper)

FROUD, Brian
and LEE, Alan (illustrations)
Faeries
Edited by David Larkin.
Editorial Director: Betty Ballantine.
Abrams/October/\$17.50

PENNINGTON, Bruce
Eschatos: Nostradamus' Prophecies of Our Future
Simon & Schuster/May/\$19.95 & \$8.95

Art Anthologies

de la REE, Gerry (editor)
The Art of the Fantastic
Gerry de la Ree/October/\$15.50

DEAN, Roger
and LEHMKUHL, Donald
and DEAN, Martyn
The Flights of Icarus
A&W/September/\$30.00 & \$12.50 (paper)

EISEN, Armand (editor)
The New Romantic Art: Dreams, Visions and Fantasies
Ariel Portfolio/September/\$7.95

Fantasy Masters:
A Journey into Dreams
Ariel/October/\$7.95

EISEN, Armand
and JONES, Bruce (editors)
Sorcerers: A Collection of Fantasy Art
Foreword by Ken Kesey.
Ariel Press/April/\$7.95 (paper)

Drew Whyte

SUMMERS, Ian (editor)
Tomorrow and Beyond: Masterpieces of Science Fiction Art
Workman/October/\$19.95 & \$9.95 (paper)
SF Book Club alternate/January/\$9.98

1979 Calendars

BAKSHI, Ralph
J.R.R. Tolkien Calendar 1979
Ballantine/July/\$5.95

FRAZZETTA, Frank
Frank Frazetta Calendar 1979
Bantam/August/\$4.95

KELLY, Ken
KEN KELLY'S
Robert E. Howard Calendar: 1979
Berkley/August/\$4.95

KELLY, Ken
and MAROTO, Esteban
and STINSON, Paul
and VALLEJO, Boris
Heroic Fantasy 1979 Calendar
Mir, Ltd./August/\$5.95

MATTHEWS, Rodney
Another Time Another Place 1979 Calendar
Big O/August/\$8.95

MATTHEWS, Rodney
Michael Moorcock's Wizardry and Wild Romance Calendar 1979
Big O/August/\$8.95
Paintings same as last year. With bibliography.

TOLKIEN, J. R. R.
The Silmarillion Desk Calendar for 1979
Ballantine/August/\$6.95

WILLIAMS, Gilbert
Projections:
The Gilbert Williams 1979 Calendar
Crown Harmony/August/\$4.95

WOODROFFE, Patrick
Patrick Woodroffe Calendar 1979
Simon & Schuster/August/\$4.95

Close Encounters of the Third Kind:
A UFO Calendar for 1979
Ballantine/August/\$4.95

The Dragon Calendar 1979
various artists.
Simon & Schuster/August/\$4.95

Heavy Metal Calendar 1979
Two Continents/August/\$4.95

The 1984 Calendar
The Distributors/August/\$4.95

Star Trek Calendar for 1979
Ballantine/September/\$4.95

Star Wars Calendar for 1979
Ballantine/September/\$4.95

The 1979 Superman Calendar
Warner/September/\$4.95

Best Sellers

Compiled as of August 1st, 1978

HARDCOVER BESTSELLERS

1. **The White Dragon**
Anne McCaffrey: delRey
2. **Strange Wine**
Harlan Ellison: Harper & Row
3. **The Way the Future Was**
Frederick Pohl: delRey
4. **The Earthbook of Stormgate**
Poul Anderson: Putnam
5. **The Ultimax Man**
Keith Laumer: St. Martins
6. **Persistence of Vision**
John Varley: Dial

PAPERBACKS

1. **Lucifer's Hammer**
Larry Niven & Jerry Pournelle: Fawcett
2. **The Dark Design**
Philip Jose Farmer: Berkley
3. **Colony**
Ben Bova: Pocket Books
4. **Kirlian Quest**
Piers Anthony: Avon
5. **Conan the Swordsman**
DeCamp, Carter, Nyberg: Bantam
6. **Lord Foul's Bane**
Stephen Donaldson: delRey
7. **Gentle Giants of Ganymede**
James P. Hogan: delRey
8. **Year's Best Fantasy**
Jerry Carr: Berkley
9. **Deathbeast**
David Gerrold: Popular Library
10. **Exiles to Glory**
Jerry Pournelle: Ace

Our thanks for their assistance goes to the following dealers: **DJ's College Book & News**, Raleigh, NC; **Book Den**, Houston TX; **Fat Cat Books**, Johnson City NY; **Tech Coop**, Cambridge MA; **The Bookstore in Paoli**, Paoli PA; **The Compleat Enchanter**, Minneapolis MN; **Partridge Bookstore**, Hollywood CA; **The Science Fiction Shop**, New York NY; **A Change of Hobbit**, Los Angeles CA; **Tobacco Corner Newsroom**, Memphis TN; **Book Nook-Too**, Manhattan KS; **Rock Bottom Books**, Fayetteville AR; **Paul's Books**, University City MO; **Howard DeVore**, Dearborn Heights MI.

Reviews

Floyd Kemske

BLIND VOICES

by Tom Reamy
Berkeley, \$7.95

Reviewed by George R.R. Martin

BLIND VOICES IS THE NOVEL of the year, and if there is any justice it will be a major contender for both Hugo and Nebula.

It is the first novel by Tom Reamy, and in that it is a singularly impressive debut. In recent memory, only John Varley has produced a first novel this accomplished, and *Blind Voices* is perhaps a tad more successful than Varley's *Ophiuchi Hotline*. Reamy, winner of the 1976 John W. Campbell Award for the best new writer in the field, proves with this book that he is one of the major talents of the Seventies.

The tragedy, of course, is that *Blind Voices* is the only Tom Reamy novel we shall ever have. Tom died last November, of a heart attack, at the age of 42.

His death makes it difficult to write about *Blind Voices* dispassionately. Better, then, to get my passions and prejudices up front, where readers can take note of them: Tom was a friend. Not a close friend, perhaps, but a treasured one. I admired his writing from the first, and I liked Tom a lot. I wanted to like his novel very much.

He made it easy for me. There is an awful lot to like in *Blind Voices*.

The story is set in Hawley, Kansas, a dusty little town that Tom also used in some of his best short stories. Some of the characters from those stories are

here, too, although they are younger in the novel, which takes place back in the early part of the century. The narrative begins with the arrival in Hawley of Haverstock's Traveling Curiosus and Wonder Show. Needless to say, the Wonder Show is more than it appears to be.

The obvious, facile comparison is with *The Circus of Doctor Lao*, and I'm sure that many reviewers will rush to point that out. But it's too easy a comparison; besides the blatant similarity of the basic situation, the two books have very little in common. Oddly, there are much stronger parallels to another book: Theodore Sturgeon's *Synthetic Man* (also published as *The Dreaming Jewels*), a much-underrated novel that I have always preferred to Sturgeon's more widely-lauded masterpiece, *More Than Human*. I would have loved to have asked Tom if he had read Sturgeon's book, and if it had been a conscious or unconscious influence on him as he wrote *Blind Voices*, but I will never get that chance, so I can only surmise.

Despite the echoes of Sturgeon's novel, Tom's book is very much his own, and succeeds thoroughly on its own terms. This is not to say that *Blind Voices* is flawless. It is not. The first few chapters are slower than they ought to be, and the narrative begins to develop real tension only when the Wonder Show itself finally opens its doors. In the early going too many characters are introduced too quickly, with no clues as to which will be most important; at times it is hard to sort them out.

So *Blind Voices* is not absolutely first-

rate Reamy, is not quite as hard and polished and perfect as "San Diego Lightfoot Sue," "Under the Hollywood Sign," and some of his other short fictions. But it is good enough, for all that, far better than run-of-the-mill SF. Its flaws are minor ones, and its strengths major, all the familiar strengths that were unique to Reamy.

The prose is lean and muscular, always direct and clear with seldom a wasted word—journalistic in the finest sense of the word. The dialogue sparkles and rings true; Tom had a good ear for catching the cadences and inflections of real speech. Hawley, drawn with loving care, seems much more than the stereotyped Small Town. It is an actual place to the reader; Reamy brings it to vibrant life. Born in small, dusty Woodson, Texas, Tom knew towns like Hawley. It shows. Larry McMurtry is the only writer I can think of who uses small-town backgrounds half so well.

But the real strength of *Blind Voices* and of all of Tom's work, is his people. He knew people best of all, and that shows, too. Those critics who charge that science fiction is incapable of producing memorable characters have obviously never read Tom Reamy. Miss Mahan in "Twilla," Sue and John Lee Peacock in "San Diego Lightfoot Sue," Haverstock and Angel and Tiny Tim (especially Tiny Tim) in *Blind Voices*—each of them has more depth and humanity and life in them than a dozen Lazarus Longs.

Perhaps it is appropriate to mention Sturgeon once again, for Sturgeon's greatest virtue was always his people.



At his best, he was a superb stylist, one of the best prosesmiths the field had produced, but even more than that he offered compassion and insight and a kind of wisdom. Tom Reamy had all of that, too, and those are rare qualities.

Blind Voices, the novel, was adapted from a screenplay that Tom wrote in his Hollywood period. The film was never produced, of course, but the screenplay still exists, and perhaps some day some ambitious producer will bring this marvelous story to the screen. There are other screenplays as well. One of them, "Sting!", also exists as a novel fragment; Tom had done several chapters and an outline, then shelved the project when the editor who had asked for it put him off. He was said to be working on another novel at the time of his death. So maybe someone will finish that book, or "Sting!", or the short stories he left unfinished, and maybe someone will convert his other screenplays to prose form, and in that way we'll have some more Reamy. And that would be good, and the books that came of it would be worth paying close attention to. But they won't be the same as if Tom had written them. No posthumous collaborator could possibly do him justice.

Meanwhile, he left us some fine writing, though not enough of it, not nearly enough. Berkeley will publish a collection of his short fiction one of these days—"Twilla," San Diego Light-foot Sue," "Beyond the Cleft," "Under the Hollywood Sign," and all the rest—and for right now we have *Blind Voices*. Buy it. Read it. And cry for all we've lost.

MILLENNIAL WOMEN
edited by Virginia Kidd
Delacorte Press, \$8.95

Reviewed by Geraldine Morse



IF I were new to science fiction, I would read Virginia Kidd's edited anthology, *Millennial Women*, with an accelerated pulse. Would we women measure up? Would we prove deficient in imagination, talent, or (worse) grammar? The success of this book would leave me almost disappointingly calm. Writers, after all, are writers first, and only then men and women. Editor Virginia Kidd—a woman and a writer—has put together a collection of stories by women about other women's lives which she hopes is even greater than

the sum of its parts.

Satisfyingly enough, there is no one woman's "line" being given out here. Only two of the six stories, Cynthia Felice's "No One Said Forever" and Elizabeth Lynn's "Jubilee's Story," display any hue of militancy. Felice writes what is not really a story at all, but a study of the mind of a woman who accepts a job that will separate her, perhaps permanently, from her lover and son. Somehow the future setting of the story seems unimportant; women—and men—have exiled themselves for purposes of self-fulfillment since the beginnings of the written word.

"Jubilee's Story," however, depends upon a definite future, where societal collapse has encouraged the formation of bands of "free" women. The plot involves the brief meeting of one band with a woman—Kathy—trapped in a male-dominated life. It is superficially moving, but no more. The "free" women are all good, and wise; the men are all either evil, or dumb; Kathy is flawed, naturally, but has possibilities if she will only break free.

Joan Vinge ("Phoenix in the Ashes") and Ursula K. LeGuin ("The Eye of the Heron") use sexual roles only peripherally. Vinge snags the reader early on with engrossing action, but the story soon gets bogged down. In her post-atomic war world a relatively civilized man embraces pastoral life with a peasant woman whose stubborn idealism is just not made all that interesting. The theme of a woman holding to her love for a forbidden man has been too exploited to be much enlivened by a future setting.

Ursula LeGuin has nothing dramatic to say about millennial women either, but "The Eye of the Heron" is the kernel of this book for which we impatiently peel back the preceding layers. The novelette begins with a long description of a metamorphic toad so entrancing that one lingers over the passage two and three times before, hesitantly, relinquishing it. The story—as usual in her work—is humming with interesting sociology: urban vs. rural, pacifist vs. activist, and man vs. woman. But women as women are secondary to the success of the story as a whole. As the author has said, "My women have always been strong, but they don't do the showy things." "The Eye of the Heron," on the other hand, is both strong and showy.

The two remaining stories, Diana Paxson's "Song of N'Sardi-El" and

Cherry Wilder's "Mab Gallen Recalled" hypothesize female/male equality from the start. Paxson enjoys inventing a planet where sociology revolves around five genders; the action lies between that alien group and humans trading on their planet, with a child the link she uses to compare and contrast the two societies. The story is unfortunately too brief to be thorough, and a little too complicated—and intriguing—to be brief.

Wilder's Mab Gallen retires to earth in a time of gender/cultural breakthrough, but the fact that she is a female doctor is really incidental to her being a space doctor. This is not so much a story as an exquisite flavor, a sweet, strong burst of character to be remembered and savored. There is a rich atmosphere of sadness here, of people and places lost forever.

Millennial Women collects stories by women about possible futures, and possible female roles. It's entertaining. It's fun to see what we are thinking. But in the end it has to be judged on its merits as fiction, and it is very satisfying to realize that these merits, anyway, have no sex. This book, like almost all good science fiction—like almost all good fiction—will appeal equally to men and women.

A DOUBLE SHADOW
by Frederick Turner
Berkeley-Putnam, \$7.95

Reviewed by Fred Niederman



HERE IS an old saying that the gates of wisdom are guarded by the twin sentinels of paradox and confusion. In his book, *A Double Shadow*, Frederick Turner seems to pull the wool over the eyes of confusion and sneak past paradox to create a very wise book.

Turner, the son of an anthropologist, was raised in Africa. He has lived in Europe, on the West Coast of the U.S., and is currently a professor of literature at Kenyon College. On one level, his book is a statement about the nature of literature. On another level it is a stylized science fiction adventure filled with complexity and intricacies reminiscent of Jorge Luis Borges.

The first of several double shadows is discovered in the foreword, where we learn that the "true" author of this work is living at an unspecified future date on Mars. Living in the relative hardship of a pioneer planet, he writes about a more graceful future some 900

years in advance of his own time.

In this future future, we find characters who have access to God-like computers implanted in their brains. They have an environment created solely by their own intentions. Their highest value is aesthetic, that of creating with their lives a work of art. They concoct their own plots, debate about style, and create a vast number of affairs. Their worst crimes are being "out of character" once they select a role, portraying bad taste in the manner in which they act out their role, and overusing the implanted computer.

From another point of view, Turner is using this story as an opportunity to blend and gently parody a variety of genres, from the epic to romantic poetry, to science fiction to travelogues, to Japanese fiction. While it recombines these different genres it does so with affection rather than bitterness, thus it is gentle parody rather than satire.

"This art is a boundary which gives size and shape to nothing, which is itself without form and void," says one of the characters in a long aesthetic lecture during this book.

Indeed, the purpose of this art is to comment on art itself. The artist is judged on his cleverness and the style with which he applies his broad knowledge of art.

And yet, despite the barrage of art for art's sake, despite the descriptions which refer back to other art works ("It is a small seaport, a crescent of moon-lantern around the bay, with the waters of the Hellenic Sea beyond, mobile as alcohol and glittering in the noon twilight. It is a seascape by Hiroshige, with an orange line at the horizon where the sun set fifteen minutes ago."), somehow Turner manages to tell an interesting science fiction story.

He devises two warring families, one headed by a character of Hector-like family loyalty, the other headed by a character of Achilles-like abandon. To make matters interesting they press a minor misunderstanding into a full-blown status war.

The two families gather their forces and their wits to simply create a more interesting story line than their opponents. They go on travels, enlist friends, and create romantic plots toward this end. The plotting done by Turner is subtle, minor characters are well drawn, and the status war gathers force and drama slowly and steadily throughout the book. The battle cul-

minates in a fascinating and stylized individual combat between the two main characters.

At its best, *A Double Shadow* is a self-conscious *tour de force*, worthy of creating a new cult. On the other hand, it can be relatively slow-moving and subtle for science fiction. I recommend it for a thoughtful and challenging change of pace.

THE 1978 WORLD'S BEST SF

edited by Donald A. Wollheim
DAW Books, \$1.95

Reviewed by David A. Truesdale

THIS is the first to appear of the four "Best Of The Year" collections, and is a good one worthy of purchase. There are ten stories included; one a Nebula nominee, two Nebula and Hugo nominees, and two others nominees for Hugos. Four have come from the pages of *Fantasy & Science Fiction*, five from *Analog*, and one from the late *Cosmos*. With all that in mind, it struck me as a small surprise that there were no truly great stories among them, though several were quite good.

"In the Hall of the Martian Kings" is the lead-off piece by John Varley. It reminds one strongly of Philip Jose Farmer's "Mother" from over twenty years ago, in terms of a totally alien environment adapting to and aiding man in his otherwise doomed attempt to survive, but for all the story's virtues—Varley's competent prose, method of exposition of the mystery, and quite frankly Varley's off-beat imagination in having us believe that the Mars colony is saved and sustained by carnival-colored shapes of organic plastic, each serving a distinct life function—there is something on the periphery of definition that is lacking. It is competent, imaginative, but not outstanding—and a Hugo nominee.

"A Time to Live" and "Child of the Sun" by Joe Haldeman and James Gunn, respectively, are time-travel paradox bits that are easily read and appreciated, relying solely on the intrigue of the interesting paradoxes for their entertainment value, just as does John Brunner's "The Taste of the Dish and the Savor of the Day" rely for its simple entertainment value on the creation of the most ideally delectable dish ever devised, and the terrible gift of immortality it imparts.

"The House of Compassionate

Sharers" is probably the best all-around story in the book. Michael Bishop's continued skill and imagination, until recently especially in his shorter work, make him a refreshing addition to any magazine or collection. This strange and solemn piece involves a man who has been rebuilt as a machine, and how he must travel to the off-world House of Compassionate Sharers in order to find himself once again. Bishop illustrates his maturity as a writer in presenting, in a calm, understated fashion, the crisis of a virtually total identity wipe. Adding to the total effect of the story is the particular Sharer he has been assigned—Wardness Kefa, the enigmatic administrator of the House, and a pair of its exotic inhabitants with which he must deal as well. A very fine, original piece of work.

The Nebula-nominated "Particle Theory" by Edward Bryant is a rather tongue-in-cheek but inventive approach to curing prostate cancer via a bombardment of accelerated mesons. On another level altogether it is just another apocalyptic story told in a rather detached and reserved manner. As one by one all the stars go inexplicably nova, including finally ours in quite a macrocosmic display, so too do we find out maybe just why, via the microscopic information we get from the research into the curing of the cancer by the meson bombardment. Again, this is a competent, well-written and fairly imaginative story, but not outstanding.

Harlan Ellison's Hugo and Nebula nominee, "Jeffrey is Five," is, in all honesty, a downright pleasure to read. It is a fun and nostalgic reminiscence into the wonderful days of adventure radio, de-coder rings, and the pulps. In an exciting but sad fantasy, Ellison helps us remember *Hop Harrigan*, *Terry and the Pirates*, *The Shadow*, *Doc Savage*, *Weird Tales*, and many other sights, sounds and smells of the past, and how the joy of the memory would never have come to be if not for a retarded little fellow who never grew up.

The Nebula- and Hugo-nominated "The Screwlly Solution" by Alice Sheldon (writing as Racoonia Sheldon) and the Hugo-nominated "Eyes of Amber" by Joan D. Vinge are interesting to compare, with Vinge's fantastical sword and sorcery excursion via telecomputer to a gaseous and strangely inhabited Titan exhibiting a deftness of skill and downright cleverness that renders the Sheldon piece by comparison a tame, if somewhat tense, Men-go-

crazy-(due to a peculiarity in the weather)-and-kill-all-the-women-and-female-children story. She attempts to compare this behavior with the male sex of a certain South American insect which is purposely bred to act in such a manner so that future generations will never come to be. The idea is pretty corny and sensationalistic, and another in the never-ending sort of story that has been with us from Day One in which a writer sees something interesting in nature and extrapolates the absurd consequences when Man is substituted ("Particle Theory" is akin to this.) It is exciting reading if you're lucky, but logical *non sequiturs* are usually more evident than vowels. This formulaized little gimmick story is certainly not Sheldon's best.

And finally, we have "Brother" by Clifford Simak, an intriguing and above average fantasy told adroitly and with a sense of definite purpose, but some small thing—or lack of some element—keeps it from having that feeling of immediately-sensed powerfulness that marks a *truly* memorable piece—and a Hugo winner.

Stepping back from a (reader's) critical viewpoint, the impression one is left with is that there are no singularly brilliant pieces in this year's *DAW Best*, but neither are there any singularly moronic duds. Judging from the fact that Donald A. Wollheim relied heavily on the traditional themes of science fiction to the practical end of entertainment rather than *excessively* cerebral, sexual, *outré* or avant garde themes or treatments, it is rather interesting that despite their expected semi-conservatism there are fully ten very much worth reading stories here, though "Rite of Spring" by Fritz Leiber, a Nebula contender and a humorous and brilliantly imaginative and superbly written piece of fun, could have taken the place of the Haldeman, Gunn, and Brunner stories quite easily. Still, this collection of stories may be Wollheim's best of the past several years.

SCIENCE FICTION CONTEMPORARY MYTHOLOGY

edited by Patricia Warrick, Martin Greenberg, and Joseph Olander
Harper and Row, \$14.95

Reviewed by N.B. Hayles



THE official anthology of the Science Fiction Writers of America—Science Fiction Research Associates (SFWA—

SFRA), this book is frankly ambitious. The least of its aims is to provide a collection of the best short science fiction available. Since how to define "best" in science fiction immediately leads to a debate between those who judge it on the basis of literary quality and those who regard it primarily as a literature of ideas, academic critics and science fiction writers worked together to choose the selections and write the introductory essays for the book's ten sections. The ten author-critic teams involved in the project represent a fair sampling of the best known names in the field, and their essays are generally well researched and well written.

So far, so good. Joining the perspectives of critic and writer resulted in at least one other popular and successful SF anthology. But this book has more grandiose things in mind. Its special angle is its attempt to anatomize the central myths of science fiction. Each of the ten essays discusses a myth, and the fiction in each section is supposed to show the myth in action. The book as a whole thus stands or falls on its theory of myth in SF. Unfortunately, it falls.

In the theoretical essay that lays the groundwork for the anthology, Patricia Warrick first defines myth: "Most simply, it is a story." This is obviously a good deal too simple, since such a definition would include all narrative fiction, and few would agree that narrative and myth are synonymous terms. So a little later Warrick adds that a myth is not just any story, but one that illuminates "the inner meaning of the universe and of human life." This is closer to what most mythographers understand by myth; but even before Warrick reaches this refinement of the term, she introduces the idea that a myth is like a scientific model, because both impose a conceptual order on the chaos of immediate experience. From here it is only a small step to saying that "myth or model functions the same way," and that when science creates new models to explain the universe, new myths arise to accompany the changing scientific world view. The argument concludes by assuming that these will appear most consistently and with greatest clarity in science fiction, so that the themes of science fiction are in fact the new myths of a post-scientific society.

The most serious error in this argument is the assumption that modern myth and scientific models function in the same way. A model is a

consciously intellectual creation. If it fails to correspond with experience, it is scrapped and a new model devised. But a myth speaks to more than man's conscious intellect, and its relation to experience is both more fundamental and less exact than a model. The usefulness of a myth is not determined by whether it accurately reflects the physical nature of the universe, but by whether it expresses what it means and feels like to be human. While a model may become obsolete in the light of a single experiment, myths (if they change at all) change only very slowly, and only when man's fundamental perception of himself and his place in the universe has altered.

It may well be that the last century has seen such an alteration. But if so, it has only a tenuous connection with changing scientific models. Mostly it has happened because people live in drastically different ways than our ancestors did. If enough of the basic components of human life have changed—the way one acquires food and shelter, the kind of environment man creates and his relation to it, the structure of the bonding systems that define human relationships—then it is plausible that new myths reflecting these changes might come into existence. Whether they would appear first in science fiction is a moot question. And certainly not all of science fiction's themes will be mythic. Many of its extrapolated futures are not reflections of man's changed conception of himself, but attempts to project consequences of recent scientific discoveries or theories. Such works are projective, not mythic.

Distinctions of this kind are completely obscured by Warrick's treatment of myth. In fact, the book's ten divisions are not mythic categories at all, but thematic ones: the criterion for inclusion seems to be simply that it appear often enough in science fiction. So, for example, "New Dimensions" is identified as a mythic pattern; so is "The Scientist," "The Machine or Robot," and "Androids, Cyborgs and Others." This is troublesome enough for a logical mind; but the categories are not even symmetrical as themes. The first category is "Ambiguity," which isn't a theme at all but a characteristic of some themes.

Perhaps most disturbing of all, especially in view of the editors' apparent hope that the book will become a standard textbook in SF courses, is the tendency of Warrick's

essay to state half-truths or highly conjectural statements as if they were well-known facts. For example, she remarks "It seems safe to assume that in previous myths both the teller and listener believed the story was true;" but according to the distinguished anthropologist Levi-Strauss, the response of primitive man to his myths was extraordinarily complex, involving what we might call a willing suspension of disbelief. Another example of a serious distortion is the claim that traditional myths have simple, black-and-white contrasts between good and evil—a claim that is going to be news to Prometheus. The theories of Carl Jung, Thomas Kuhn, Sir James Frazier, and Joseph Campbell suffer from similar oversimplifications that have the effect of deadening thought and stifling debate. Students using this essay as a text are not likely to be encouraged into original thought or provoked into a lively exchange.

I have stressed the Warrick essay because it lays the groundwork for the book as a whole. It is, happily, not typical. Many of the essays introducing specific categories are very good indeed, perhaps because they are less burdened with mythic theory, concentrating instead on the particular manifestations of a theme. Each provides a historical overview of its theme, and includes a brief but carefully selected bibliography of major works using that theme.

The short stories themselves are probably the best part of the book. There isn't a bad story in the bunch, many are good, and a few superb. The selection has of course been affected by the controlling idea for the anthology, so the stories tend to be about myth even if they are not themselves mythic. Roger Zelazny's "The Game of Blood and Dust," Brian Aldiss's "The New Father Christmas," Philip K. Dick's "The Father-Thing," Poul Anderson's "Goat Song," Arthur C. Clarke's "Before Eden," and Ursula K. LeGuin's "Nine Lives" are all likely to be familiar to SF fans, but their inclusion here makes the anthology valuable as a source of first-rate stories.

The book succeeds best where its aims are most modest. As an anthology of short stories, it is excellent; as a collection of critical essays on major themes in science fiction, it is well worth reading; as a theoretical treatise on the nature of modern myth, it is sadly lacking. The first two alone make

it worth the price. If nothing else, the book provides, as Fred Pohl claims in the Introduction, many hours of first-class reading.

THE EARTH BOOK OF STORMGATE

by Poul Anderson
Berkeley-Putnam, \$10.95

Reviewed by John H. Costello

FOR THE many fans of Poul Anderson's characters, Nicholas van Rijn and David Falkayn, this book will come as a welcome treat. It collects between hard covers those technic future history stories left out of *Trader to the Stars*, *The Trouble Twisters*, *Satan's World*, *Mirkheim*, and *The People of the Wind*.

Like everything trademarked "Poul Anderson," *The Earth Book of Stormgate* (the newest collection of these stories), displays a creative imagination, ingenuity, logic, poetry, and all round competence matched by few in the SF field and fewer still outside it.

The "technic" future history extends from around two centuries from the present upwards (Anderson often deliberately fudges dates; he was burned once when WWII didn't happen on time, a circumstance he is on record as not regretting). It dates from the development of extremely cheap power and interstellar travel, encompasses the expansion of mankind to other stellar systems, the discovery of non-human sophonts, the gradual merger to one civilization (The Poleosotechnic League) and the decline into the Empire stories of Sir Dominic Flandry. It is a story of almost continuous growth and development, and enrichment paralleled in the creation of the series itself. The first stories were published in the early '50s, and the future history was firmly established when John W. Campbell, late editor of *Analog*, gave Anderson the idea for a post-mammalian species with a biological supercharger. Anderson came up with the Ythri, the people of the wind, whom he has managed to weave into the series in stories published since then.

The Ythri are winged carnivores, natural hunters, intelligent predators. Consider how much difference from mankind is encompassed by this description: in temperament, culture, religion. Anderson's explorations of these differences make for some of the finest reading of the decade.

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Each year *Galileo* magazine presents a cash prize to the author of the best science fiction short story under 3000 words. We do this because we want to provide encouragement for the artform and because we want to publish good stories. The catch is that the only stories considered in the contest are those offered to *Galileo* for publication on our usual terms (first North American serial rights). The winning stories (first, second, and third places) receive cash prizes in addition to our regular payment.



PREVIOUS WINNERS
Harlan Ellison
Kevin O'Donnell, Jr.
John Alfred Taylor

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First Prize: \$300
Second Prize: \$200
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ADVICE FROM THE EDITORS

The editors of *Galileo* magazine are responsible for sending the entries of the finalists to Hal Clement for judging. We intend to send at least ten stories, but we will place among the finalists all the short stories we have received (under 3000 words) which are written in a professional manner and achieve a synthesis of theme, plot, and characterization in a science fiction setting. Special attention to those characteristics must put your entry among the finalists.

CONTEST RULES

Entries must be completely original, previously unpublished science fiction stories under 3000 words in length. Manuscripts must be typed (clear photo-reproductions are acceptable) and submitted by the author with a self-addressed envelope and sufficient postage for the story's return. Entries must be received by December 31st in order to be considered for this year's prize. Winners will be announced in *Galileo* magazine in the Spring of 1979.

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Publishers Notes

Problems and nightmares.

I ONCE saw a farmer kicking a horse. When I inquired as to the reason, he replied, "He wouldn't do what I told him, and I don't know why." I pursued the subject. "Well, you agree he is a dumb animal..." "Yes," the farmer said. So I continued, "Then why do you expect him to understand you, when you cannot understand him?" The farmer did not like this line of reasoning, and went back to kicking his horse.

This has something to do with the problems we have been facing with our computers. They are dumb animals indeed, but the essence of their stupidity is their absolute consistency. They *only* do what they are told—no more, no less. The people who run them, however, bring the essence of stupidity to its ultimate art. When the computer only does what they asked for, they kick the computer...We at *Galileo*, having to live by the codes of civilized man, cannot kick the people who enter the data, or design the programs which make the machines work.

Our ultimate goal here is to be independent. One day we will own our own press. Even sooner we hope to own our own computer. As it is, we do every other task except the actual printing, and the sheer numbers of our subscribers made us give up our manual in-house system of names and addresses over a year ago. In this last year we have fired two computer companies, and lost a third to bankruptcy. In each transition from company to company, information was lost, new mistakes were made and had to be found. The

publisher is responsible for choosing the sub-contracted firms. He is kicking himself, but little good does it do for those many new subscribers who waited two and three months to get their first issues; it cannot reclaim money lost because duplicate copies were sent, or when subscribers cancelled. It does not help to know that many publications go through the same headaches. What helps is to get it right.

We think we have got it right—for the most part. We are literally going through the files name by name and cleaning up the mess left by human foolishness...So don't cuss the computer. Cuss us. We'll fix the problem in every case and see to it that you get the copies coming to you. Just let us know if you're one of the unhappy subscribers. Speak to us. Unlike horses, we'll answer back.

Issue #9 of *Galileo* was not shipped to subscribers until the week of August 14th due to our computer problem, though it came off the press right on schedule, one month before. It appears that this issue will be sent out about the week of September 14th. With a little luck, and a lot of hard work, we think you'll be seeing your subscription copies on time from here on out.

—G—

Reviews (continued from page 91)

presented in chronological order, from the first contact between man and Ythri ("Wings of Victory") to the early years of the mixed human/Ythri colony world, Avalon. The connecting material written for the book presents itself as a study guide of humanity for Ythrians ("Stormgate" is the Cloth or subsidiary to which Christopher Holm belongs in *People of the Wind*), and of their own species as seen through the eyes of aliens—in this case, humanity.

The most notable of the stories are "The Problem of Pain" and "The Man Who Counts." The first is one of the finest religious SF stories ever written (for, if we create our gods in our own image, what then is "god" to a winged carnivore with an estrous cycle?); the second is the uncut magazine version of Ace's *War of the Wing-Men*. A comparison of the texts makes one doubt the sanity of copy editors. (Ace, under editor Jim Baen, has since repented its villainy and reprinted the book as originally written, with a

delightful new cover showing van Rijn being rescued from his wrecked yacht.)

Some of the stories have been previously unavailable to the general SF reader. "How to be Ethnic" and "Wingless on Avalon" appeared in Roger Elwood anthologies, "Season of Forgiveness" and "Rescue on Avalon" in *Boy's Life*. "Margin of Profit," the story that introduced Nick van Rijn to the readers, was anthologized only once in the early '60s. "Lodestar" appeared first in the John Campbell memorial anthology edited by Harry Harrison, and, with "Essau," forms the background to Anderson's latest van Rijn novel, *Mirkheim*. The rest of the stories help embellish Anderson's already rich and tapestried universe.

AND HAVING WRIT...
by D.R. Bensen
Bobbs-Merrill, \$8.95

Reviewed by Floyd Kemske

I N OUR time, the effect of the Tunguska meteorite of 1908 was just loud noise and a lot of flattened pine trees. There is an alternate timeline, however, in which that meteorite failed to strike Siberia and fell into the ocean. When an American vessel happened upon it, it turned out to be a spaceship bearing four passengers who had the most profound effects on the social history of the Earth in which they found themselves. D.R. Bensen wrote a novel about this alternate timeline, underscoring the fate-altering role of the alien presence by an allusive title from a verse of *The Rubaiyat of Omar Khayyam*. ("The moving finger writes; and having writ,/Moves on: nor all your piety nor wit/Shall lure it back to cancel half a line,/Nor all your tears wash out a word of it.")

The novel is more playful than its title implies, as the aliens cavort from continent to continent attempting to mold the conduct of Earth affairs to their own purposes. They meet the important monarchs of Europe and have run-ins with many of the colorful personalities, being guided in their travels by a newspaperman from the Hearst company as well as the novelist, H.G. Wells.

They get drunk frequently (not Wells and the newspaperman, the aliens). One of them does a song-and-dance stint in vaudeville for George M. Cohan. Another enables the Romanovs to kick

Reviews

Grigory Rasputin out of the Winter Palace by curing the Czarevitch of his hemophilia.

All of this happens because the four spacemen have conceived a plan. According to the established principles of metahistory (in which one of them, the ship historian, is well-schooled), a Level Four culture with this type of international alliance system must plunge eventually into a general war. The earlier the war, the alien adventurers decide, the sooner technological spin-offs will enable the primitive natives to help them make the repairs to their spaceship so they can leave the place. They therefore call on the crowned heads of Europe (on the theory that monarchs are able to act more rationally than elected officials) to offer each the chance of an early start on unimaginable slaughter and destruction. It is not the business of a reviewer to reveal the outcome of a novel; suffice it to say that the election of Thomas A. Edison to the U.S. Presidency is one of the smallest changes wrought by the presence and actions of the aliens on Earth.

The humor of it comes partly from the farce itself and partly from the cross-cultural misunderstandings, as when one of the aliens encounters John Barrymore in a bar and discusses Shakespeare with him: "[I hoped] to learn something of this Hamlet matter, but he then changed the subject, advising me that being was the central question of existence (or possibly the other way round; his terms were elaborate and unclear) and then, in the face of certain conditions (which he enumerated), voluntary termination of life might be called for."

The resulting novel is something like a P.G. Wodehouse version of *Nicholas and Alexandra*: historical characters of unerring authenticity march onto the stage and embroil themselves in events of farcical complexity. The author is an obvious admirer of Wodehouse and it is said (in our own "Aleph," last issue) that he obtained permission from the humorist before his death to use him as a minor character. It is a novel worthy of Wodehouse (although I'll be damned if I can find him in there): fast-paced and funny.

Barrymore would call it damning with faint praise to say this is the funniest alternate timeline story every written. It is a good book, however, and thoroughly enchanting.

—G—

Reviews/Telescope



"I'm one of those writers who tends to sweat over each word. On a good day, I might get 2000 to 3000 words of first draft, which means working from breakfast to dinner, with no break for lunch. I spend the evening going over it with great care, trying to get the language just right. This continues until my first draft is polished to my liking. I'll then let it cool for a while. Later, I'll come back, look it over once or twice, then type up the clean copy. That part goes pretty fast, primarily because so much work has been done already. Even then, however, I'll go over it with a fine-toothed comb.

Interview: Poul Anderson
by Dr. Jeffrey Elliot

Telescope

Our future

Let us suppose that you are a Russian agent and that you have secretly managed to kidnap one of Jimmy Carter's body cells (watch your blood samples!). The Russian scientists insert its genetic constituents into an emptied human egg. How long will we have to wait before we can switch? Forty-five years sounds like a reasonable minimum. But let's suppose we have a lot of luck with pre-mature aging hormones—from all we know it seems impossible that much time could be cut from the first ten years of growth without obvious physical effects. So you might get a duplicate of President Carter some twenty years after he left the White House. Eat your heart out Igor Bondskii! *Cloning Human: Hopes, Fears, and Myths* by Justin Leiber

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Star Chamber

C.J. Cherryh

IF YOU ask C.J. Cherryh about her favorite author, she tells you without hesitation "Publius Vergilius Maro." Most people know her favorite author as Vergil and she feels his influence on her work has been very direct: "I learned writing by trying to put his works into English and discovering the task is impossible." Beyond that, however, she never had a writing course. She was trained in the classics and taught ancient history and Latin until she gave it up to pursue her writing full time. Her first novel, *Gate of Ivrel*, was published in 1976 and, by a remarkable feat of literary production, she had had three novels published before the fans were able to vote her any awards. In 1977, however, they gave her the John W. Campbell Award for Best New Writer of the Year. *Well of Shiuan* (DAW), the sequel to her first novel, and *The Faded Sun: Kesrith* (DAW), the first volume of a projected trilogy, were published in 1978. She is as loyal to her readers as they are to her and seems to cherish them. "To talk to people who've enjoyed what I've written," she says, "gives me the feeling one gets from knowing a gift one has given has worked out just right." In writing, she does what she has always wanted to do and needs nothing else. She must want to do it, as is obvious from her work habits: "I'm always working on a novel. I never mail one out but that before I go to sleep that night, I've typed at least the first line of the next novel. I've been a two-page-a-day writer since I was ten; now that I'm working full time at my writing it goes up to twenty. Sometimes."

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